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USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

No. 36

This serial publication contains abstracts of articles and news items from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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I. DEVELOPMENT AND PRODUCTION OF COMPUTERS AND CONTROL EQUIPMENT

A. General Treatment

USSR

THE IDEA BANK

YURCHENKO, I., Correspondent

[Abstract] An interview with Vyacheslav Vladimirovich Sychev, dr in technical sciences, Professor, Laureat of the State Prize of the USSR, Director of the All-Union Scientific and Technical Information Center, State Committee for Science and Technology, Council of Ministers, USSR is reported. Sychev discusses the information explosion, now amounting to several millions of scientific articles published each year. He draws a contrast between capitalist science, in which ideas are buried as they are born unless they serve the needs of the industrial organization financing the research, and socialist science, in which ideas are freely shared among scientific colleagues, in order to gain the most benefit for the people. Sychev describes the work of his institute, which receives thousands of publications, microfilms them, abstracts them, enters the basic ideas of the publications into computer memory and stores them, so that when search requests are received, the information requested can be retrieved from the computer in the form of abstracts of articles and books, and, if necessary, photocopies of the books or abstracts themselves can be made and sent to the requestor.

B. Problem Areas

POLAND

TOPICAL PROBLEMS OF COMPUTERIZATION. PART 3. REQUIREMENTS OF COMPUTER
USERS

CHELCHOWSKI, JERZY, Academy of Economics, Wroclaw

[Abstract] This is the third of a series of papers which discuss the prin-
cipal problems of computerization in Poland. The needs of computer users
are characterized. Comprehensive customers' service, guidance, and responsi-
bilities of computer producers in this respect are discussed in detail. Fig-
ures 1.

USSR

CONTROL COMPUTERS AT CHEREPOVETS FERTILIZER PLANT VIRTUALLY NONOPERATING

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian ["Electronic Computers for Show"] 11 Jun 78 p 2

IVANOV, YE., foreman, Process Control Instruments of Weak Acid Shop, Nitrogen Fertilizer Plant, and SHAYDULOV, B., electrician, Computer Section of Process Control Instrument Shop. Cherepovets

[Abstract] An automated technological process management system, with an UM-1 electronic computer, was placed on operational status at the Cherepovets Nitrogen Fertilizer Plant in Dec 1973. A bonus and newspaper publicity marked the occasion. Next in Sep 1974 came an automatic regulation system for natural gas consumption in a process reactor, also bonus-winning and reported in the Cherepovets city newspaper. Apr 1975 saw a system installed for automatic stabilization of the temperature condition of a turbine, announced in plant, city and central newspapers. The same year yielded automatic post-reactor regulation of the gases. Last of all, in Dec 1977 an automatic regulation system for acid concentration was supposed to be operational. But all systems are shut down 95 percent of the time; this is true also of the highly touted turbines. The expression "placed in service" is understood by plant executives to mean merely "tested." Management systems heavily reported as innovative, but in reality lacking followup states, constitute the grossest deception. Mathematical modeling of the controlled object, algorithms and computer programs suffer from low priority and under-staffing in the authors' Cherepovets plant section: one programming engineer out of nine section personnel. Section staffing has only two engineer slots; the other seven are classed as worker's positions. But the new "M-6000"-- fourth-generation--control computer receives just two 2-hour sessions of preventive maintenance a year. Computer operators are therefore nearly always unoccupied. Ample time is available for mathematical modeling, algorithm-writing and programming for the plant control computers. Inexplicably, personnel with worker qualifications are hired for the section position, even though many computer engineers employed elsewhere in worker positions are eager for higher job placement. At many other plants, staffing errors like these in automatic process management systems bar computer operators from a working knowledge of process management instruments.

USSR

COMPLAINTS ABOUT COMPUTER EQUIPMENT AT STEEL COMPLEX

FOMIN, N., chief engineer of the Metallurgy Combine imeni V. I. Lenin

[Abstract] Nizhniy Tagil--The Nizhniy Tagil Metallurgy Combine, a large complex in the Urals, produces more than 30 percent of the USSR's railroad rails and almost 40 percent of its railroad car wheels. The author contends that, despite this, the combine is not fulfilling its capacities in production. One complaint is that computers and computerized management systems are not being supplied in complete sets. The Kiev Automation Institute of the USSR Ministry of Instrument Building, Means of Automation and Control Systems (Minpribor) sent poor-quality equipment for the construction of a universal wide-strip rolling mill, which caused specialists a good deal of extra work in adapting and re-outfitting the system. According to the author, computerized systems are still not operating in a number of production facilities which were commissioned some time ago.

C. Production Plants

USSR

PROGRESS OF THE "SIGMA" PRODUCTION ASSOCIATION

Moscow EKONOMICHESKAYA GAZETA in Russian ["The 'Sigma' Association"] No 13, Mar 78 p 4

[Abstract] The basic product of the "Sigma" production association in Vil'nyus is a line of punchcard computers. Another product, a single-disk accumulator which went into production in 1977, can store seven times as much information as former devices. Introduction of the M5100 computer complex, also developed there, is saving the national economy 1.8 million rubles per year.

"Sigma" has already fulfilled its first plan, adopted last year, completing two years' work of its five-year plan on December 2, 1977. The rate of production has increased over that of the year 1975 by 36 percent, and productivity of labor by 34 percent. Twenty-seven percent of the machines produced are in the highest category of quality.
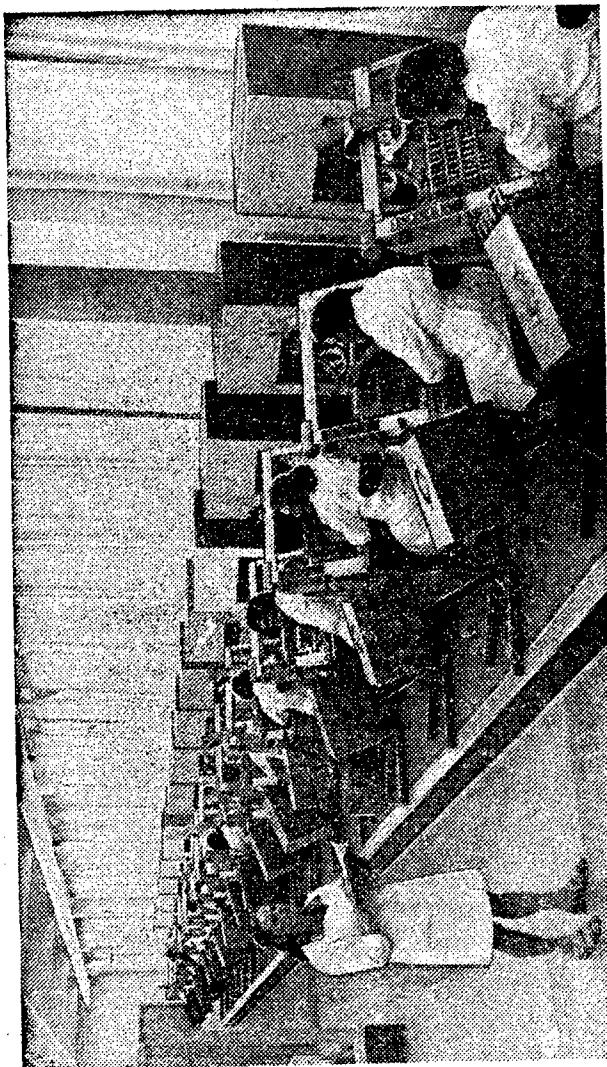
USSR

NEW PRODUCTION FACILITY AT VIL'NYUS CALCULATING MACHINES PLANT

Vil'nyus SOVETSKAYA LITVA in Russian ["House-Warming at the Plant"] 18 Jul 78 p 1

[Abstract] A new production facility has gone into service at the Vil'nyus Calculating Machines Plant imeni V. I. Lenin. Workers from the electronics and assembly shops have been moved into the brightly lit, spacious facility, and highly productive new equipment has been installed. New production capabilities are systematically being installed at the plant in order to help achieve the national goal of a 1.8-fold increase in the output of computer technology during the 1976-1980 Five-Year Plan.

In the photographs: an overall view of the sector for wiring modules for the M-5000 computer; V. Vasilyauskene, one of the sector's best workers.
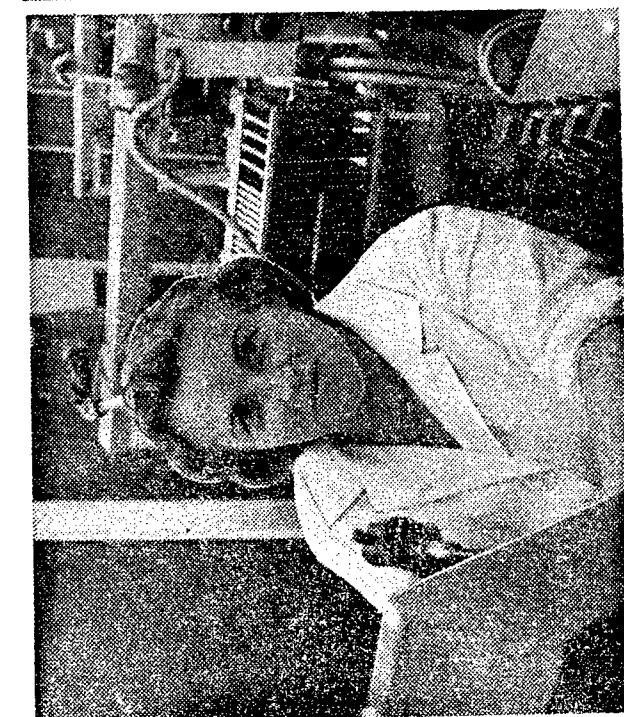
НА СНИМКАХ: общий вид участка монтажа блоков вычислительных комплексов М-5000; одна из лучших монтажниц участка В. Василяускене.

USSR

AUTOMATED TECHNOLOGICAL PROCESS MANAGEMENT SYSTEM INSTALLED AT COMPUTER
PLANT

Vil'nyus SOVETSKAYA LITVA in Russian ("ASUTP Goes into Operation") 19 Jul
78 p 2

[Text] An automated technological process management system for wiring com-
puter modules has gone into operation in the electronics workshop of the
Vil'nyus Calculating Machines Plant. The computer dictates the sequence of
operations to the assemblers in accordance with a programmed scheme and also
locates the "address" of the technological process, i.e., it determines the
wiring location and the dimensions of the wire. Previously, this labor in-
tensive and indeed intricate process necessitated a great expenditure of
time on the part of the assembler and caused her to become tired quickly,
which increased the possibility of an error.

In the photograph: a section of the electronics workshop, managed by the
automated system.

HUNGARY

ES-1035 COMPUTER SYSTEM DISCUSSED

Budapest SZAMITASTECHNIKA in Hungarian May 78 p 4

MIKICS, JENO and VARGEDO, TAMAS, Central Statistical Office, Computer Technology Research Institute (SZAMKI)

[Text] The R-35 (ES-1035) computer is the first member of the ES-2 series. Thus, it is compatible from above with machines of the ES-1 series. In recent years more and more institutions--scientific, technical and organizational institutes, production enterprises, administrative and national service organs--have joined the ranks of computer users. Further acceleration in the process of computerization is to be expected in the future. These increased demands have necessitated the further development and perfection of the ES-1 series making use of available experience. Machines had to be developed which could easily be adapted to changes in hardware and the sphere of use both at the macro and microprogram level.

Enterprise and administrative users desire systems which are capable of processing a great volume of data or of being used to set up an efficient system of information retrieval based on data. The traditional local batch processing mode is inadequate for this purpose: Network solutions which can bridge geographical distribution are needed. An important requirement of scientific and service institutions is for several users to be able to have access to equipment simultaneously and to be able to have contact with the machine in the dialogue mode. Realization of the foregoing calls for new hardware and software some of which was taken into account in designing the R-35. The remainder is not be expected until the second phase of development.

New Features Realized in the ES-1035:

Refillable microprogram storage: This integrated circuit operating storage stores microprograms filled from the magnetic tape casette of the machine operator. Microprograms can easily be changed which to a very great extent simplifies changes in the configuration of the computer.

Diagnostic System

With the aid of the diagnostic microprogram which can be obtained from the magnetic tape unit of the machine operator, the site of errors can be determined (all the way to the level of the connected units) and this speeds up corrections. The microdiagnostic system makes it possible to check the operability of the entire central processing unit within 7-15 minutes. With the aid of recently introduced floating point operating instructions, in the set of instructions, 128-bit operands can be processed. When the operative or microprogram is inscribed in the storage, a repair code is also inscribed

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and stored. The repair or correction code makes possible the correction of one-bit errors and the indication of two-bit errors.

A repeating microprogram takes control in case of error or defect in the central processing unit. This restores the situation to pre-error conditions, and control switches to that part of the microprogram where the error occurred. The microprogram inspects the defective portion eight times. If it succeeds in getting beyond the part where the error was made, work continues but the error becomes set.

Proposed Development

During the second stage of development some additional pieces of hardware will increase the potential of the machine. The new CMOS based operative store will greatly reduce the cycle time of the storage. Thus the performance of the processor will increase, but the maximum storage capacity will increase as well. With the arrival of the 100 M byte magnetic disc unit, not only will a high-capacity auxiliary storage be realized, but it will become possible to organize the selector channel for block-multiplier operation. This type of channel makes it possible for a number of high-speed peripherals (auxiliary storage) linked to it to operate alternately in a mode similar to bursts and this results in better utilization of channels.

However, the most important change is expected in the field of software, namely inclusion in the new operating system of virtual store handling. The directly addressable storage, divided into sheets and containing a maximum of 16 M bytes for each program, will be stored on magnetic discs. Only the currently used system and users' program pages will be stored in the operative storage. Handling of the virtual storage is entirely transparent to the user. Use of the virtual storage makes possible realization of the system of the virtual machine: that is, formation of a super operational system in which the actual resources of the machine are divided between several virtual machines as defined by the user. The consumers, themselves, can select the operating system valid for them; this is an advantage, especially in certain time-sharing applications, in the development of new systems or when there is a switch from one operating system to another. Realization of the above plans will greatly enhance the effectiveness of the R-35 system, and the selection of devices will increase with modern hardware and software.

Components for the R-35

Central unit (ES-2635), fixed and floating point decimal arithmetic; logic and remote data transfer operations; possible forms of data: byte, half-word (two bytes), word (four bytes), double word (eight bytes). An essential part of the central processing unit (ES-2435) is the maximum 64 K byte, 200 nanosecond cycle time microprogram store into which information can be fed from the magnetic tape storage (ES-5009) of the console.

The R-35 has two kinds of operational storage: a 2 microsecond cycle time,
256-K byte ferrite ES-3237 and the semiconductor based ES-3235 which can be
linked to it. The cycle time of the latter is 0.85 microseconds. Between
256-1024 K bytes fit into a case of the same size as the former [ES-3237?].
The number of sub-channels of the multiplex channel can range from 16-128.
A maximum of eight peripheral control units and 248 peripheral units can be
interfaced with it. A maximum of four selector channels can be used with
a maximum of 8 peripheral control units.

Key to Comparative Table

1.   Comparative Table
2.   Model
3.   Internal Storage, K bytes,
     cycle time, microseconds,
     type
4.   Operating Speed measured in
     Gibson-1, 1,000 operations
     per second
5.   Fixed Point Addition Time in
     microseconds
6.   Multiplexer Channel Transfer
     Speed, K bytes/sec
7.   No. of Selector Channels &
     Transfer Speed, K bytes/sec
8.   Total Transmission Capacity,
     M bytes/sec
9.   Operating System
10. Number of Instructions
11. Translation Programs
12. Connectable Peripherals:
     Magnetic disc, M byte
13. Magnetic Tape, CP1
14. Semiconductor
15. 2 Selector or 2 block mix
16. Planned
17. Under Development

Összehasonlító táblázat

Modell	R-30	R-32	R-33	R-35	IBM 370/135
Belső tároló, Kbyte ciklusidő, mikrosec típus	128–512 1,25 ferrit	128–1024 1,2 ferrit	256–512 1,5 ferrit	256–1024 2/0,85 ferrit/CMOS	96–512 0,275/0,825 félvezető
Műveleti sebesség Gibson-I-gyel mérve, ezer műv./sec	50,8	220	200	160–200	–
Fixpontos össze- adási idő mikro- sec	9–11	2,4	1,4–2,7	2,4–2,8	4,2
Multiplex csatorna átviteli sebesség, Kbyte/sec	40 300	110 230	51 310	40 120	41 150
Szelektor csator- nák száma átviteli sebessége, Kbyte/sec	3 600	3 1500	3 800	4 740	2 sel, vagy 2 blokk mx 1300
Teljes áteresztő- képesség, Mbyte/sec		2,5	2,75	1,2	2,6
Operációs rendszer	DOS–ES, OS–ES	DOS–ES, OS–ES	OS–ES	DOS–ES, OS–ES	DOS, OS/MFT, DOS/VS, OS/VS1, VM/370.
Utasítások száma	139	143	144	172	163
Fordító progr.: Assembler RPG COBOL FORTRAN IV ALGOL PL/1– BASIC APL	 x x x x – x – –	 x x x x – x – –	 x x x x x x – –	 x x x x x x – fejlesztik	 x x x x – x x x
Csatlakoztatható perifériák: mágneslemez, MByte	7,25	7,25	7,25/29	7,25/29 100 terve- zett	7,25/87/100
mágnesszalag, CPI	800	800	800 1600 ter- vezett	800 1600 terve- zett	800/1600/ 6250

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USSR   UDC 681.325.5:539.4.015.1:681.3.01

PRINCIPLES OF STRUCTURAL ORGANIZATION OF A STANDARDIZED FUNCTIONAL ELEMENT
BASE AND DATA PROCESSING HARDWARE WITH LSI

GRINKEVICH, V. A., candidate in technical sciences

[Abstract] In all attempts to date to develop fourth-generation computers,
either the chip manufacturers or the hardware manufacturers have reigned
supreme, resulting in attempts to develop computers based on "universal
chips: with inherently third-generation structure, or attempts to force the
development of customized chips, so specialized that the large-scale manu-
facture necessary for LSI economies cannot be achieved. The author pro-
poses that the process of development of the structure of the data process-
ing hardware and the structure of the LSI chips be considered a single pro-
cess, in which the optimal relationships between universal and special,
flexible and rigid, stable and developing, simple and complex, single-pro-
cessor and multi-processor are achieved, considering all of the interrela-
tionships involved. Based on this standpoint, the structural organization
of a certain idealized data processing system is analyzed, in an attempt to
increase the effectiveness of the hardware by increasing the degree to
which it meets the requirements of the user, utilizing multi-processor or-
ganization, increasing the degree of integration and decreasing the cost of
LSI chips and decreasing the operation of switches. Based on these princi-
ples, a standardized functional element base is being developed for the uni-
fied series (YeS) of computers. The YeS microprocessor chip system current-
ly includes the following three LSI sets: a set of microprocessor chips
based on injection logic--the YeS MP I^2L: a set of chips of somewhat high-
er productivity based on TTL circuits--the YeS MP TTL: and a very fast set
of chips, based on low-level logic circuits with emitter coupling--YeS MP
ECL. Data in the paper which has a debatable nature (principally in the
part of the method of analysis and evidence) appeared as the result of com-
bined investigations performed by the author with the specialists in the
structure of electronic computers F. S. Vlasov, A. T. Yeremin, A. P. Zamorin,
and especially V. F. Gusev and M. Z. Shagivaleyev. Figures 3; references
5: 4 Russian, 1 Western.

E. Hardware

POLAND

SQUARE-LOOP FERRITE CORES IN THE WORKING STORAGE OF MODERN COMPUTERS

DABROWA, JERZY, Institute of Design and Technology of Automation and Information Devices, Silesian Polytechnic, Gliwice

[Abstract] Development of the design and application of the square-loop ferrite cores in digital computers is described. Advantages of these cores and the prospects for their further development and use are discussed against a background of other technological solutions. This article is published in response to the readers' opinion survey re: ferrite core storage vs. semiconductor storage, their prospects of development and why? Tables 3; references 10: 4 Polish, 1 Czech, 3 Russian, 2 Western.

CONCERNING ONE APPROACH TO A SOLUTION OF PROBLEMS OF OPTIMIZATION OF THE
STRUCTURE OF EXTERNAL MEMORY IN AN AUTOMATED MANAGEMENT SYSTEM

YUROVSKIY, BORIS YUR'YEVICH, graduate student, MISiS [Moscow Order of the
Red Banner of Labor Institute of Steel and Alloys] (Moscow)

[Abstract] The paper considers an approach to a solution of problems of designing a multilevel memory structure, intended for the layout of the data
base of an automated management system (ASU) with a large volume of information holdings, the use of which make it possible to optimize hierarchy of
the memory unit with respect to various additive criteria, and during this
to take into account not only the cost and speed of response but also other
characteristics of the memory unit, independently of the relations between
them. The method is based on the employment of dynamic programming ideology.
An example of the problem of optimization of a multilevel memory structure
and the method for its solution are presented. Tables 1; references 7: 6
Russian, 1 Western.

MICROPROCESSOR REALIZATION OF INSTRUCTIONS FOR PROCESSING OF TEXT PROGRAMS

ASRATYAN, RUBEN EZRASOVICH, engineer, IPU AN SSSR [Institute of Problems of
Control, USSR Academy of Sciences] (Moscow); VOLKOV, AL'BERT FEDOROVICH, dr
in technical sciences, IPU AN SSSR (Moscow); and LISIKOV, VIKTOR TIKHONOBICH,
candidate in technical sciences, IPU AN SSSR (Moscow)

[Abstract] This article analyzes microprocessor implementation of a number
of specific instructions intended for the processing of text programs in
high-level languages. These instructions essentially perform the most widespread and slowest functions of compilers. It is assumed that the 16-bit
microprocessor has up to 64 K bytes, using a 16-bit word for storage of text,
tables and programs. A two-byte buffer is used at the microprocessor input.
The results of a comparison between microprocessor implementation and traditional implementation indicate that with identical memory access time, the
microprocessor implementation is an order of magnitude faster, primarily because of time lost in the traditional implementation to retrieval and preparation for performance of instructions, the special selection of the configuration of the microprocessor, allowing maximum acceleration of the basic

micro operations: byte-by-byte reading (and writing) of text from memory as well as the use of the "conveyor" method of processing of microinstructions, combining the phases of performance of the current microinstruction with reading of the next microinstruction. When run on an INTEL-3000 system, some 30 integrated circuit chips must be used, but the speed of compiling is at least doubled in many cases. Figures 2; tables 1; references 11: 6 Russian, 5 Western.

INFLUENCE OF POSITIONAL REPRESENTATION OF BINARY AND NON-BINARY NUMBERS AND NUMBER BASE ON SPEED OF A COMPUTER

BRYUKHOVICH, YEVGENIY IVANOVICH, dr in technical sciences, IK AN USSR [Cybernetics Institute, UkrSSR Academy of Sciences] (Kiev)

[Abstract] This article analyzes problems related to the influence of the positional representation of numbers in systems of notation with base $B \geq 2$, and the base B, on the time required to perform addition in a computer. The synthesis of binary adders using positional notation allows: automatic testing of adders during any stage of adding; a smaller number of stages of passage of signals through single-bit, 3- and 2-input adders; a decrease in the required number of logic circuits; and independence of all these qualities on the base of the system of notation. Therefore, the selection of a base other than 2 can additionally increase speed. The effect will be even greater in multiplication. Figures 3; tables 1; references 6 (Russian).

USSR   UDC 681.39:681.327.8

SOME PRINCIPLES OF CONSTRUCTION OF A COMMUNICATION PROCESSOR

DETKIN, VLADIMIR GRIGOR'YEVICH, engineer (Cherkassy); SAPRONOV, ALEKSANDR ALEKSANDROVICH, engineer (Cherkassy); STASHKO, VIKTOR SIGIZMYNDOVICH, engineer (Cherkassy); and YAKOVETS, ALEKSANDR KONSTANTINOVICH, engineer (Cherkassy)

[Abstract] Certain principles of construction of communication processors are analyzed on a basis of the results of development of a small message switching center. The communication processor (SP) was developed with consideration given to the possibility of its use in the design of subscribers' terminals. This determined the structure of the small switching center, as a multi-processor system, with the inclusion of several identical, relatively simple communication processors, the throughput capacity of each of which is sufficient to perform the functions of control of subscribers' terminals. Technical data are presented for the SP version actually built. This 8-bit processor and the method of its design are considered promising, because they not only provide flexible design of data transmission system hardware with varying throughput capacity and complexity, but also assure high reliability of functioning of the hardware. Figure 1; table 1; references 4 (Russian).

USSR   UDC 681.327.66

ANALYSIS OF THE AREA OF STABILITY OF OPERATION OF A MEMORY DEVICE AS A FUNCTION OF THE LEVEL OF DISCRIMINATION OF INFORMATION SIGNALS

SHAMAYEV, YURIY MATVEYEVICH, dr in technical sciences, MEI [Moscow Order of Lenin Power Engineering Institute] (Moscow); OGNEV, IVAN VASIL'YEVICH, candidate in technical sciences, MEI (Moscow); and BEKBOLOTOV, TURSUNBEK BEKBOLOTOVICH, graduate student, MEI (Moscow)

[Abstract] An analysis is presented of the influence of the level of discrimination of information signals on the deviation of this level in the area of stable operation of a memory unit. The method developed in this article for calculation of the level of discrimination of information signals assures optimal probability of correct reading of "1" and "0" signals.

An equation presented allows the necessary area of stable operation of the memory device, required to assure an assigned level of reliability, to be determined. Three other equations allow analysis of the influence of the level of discrimination on the area of stable operation of the memory device considering the assigned level of reliability. Figures 4; references 2 (Russian).

METHODS OF HARDWARE ACTUALIZATION OF DEVICES FOR READING FLAT MAGNETIC DOMAINS

VASIL'EVA, N. P., dr in technical sciences, SEDYKH, O. A. and FIOSHKINA, O. M., candidates in technical sciences

[Abstract] One important part of a memory unit based on the movement of flat magnetic domains ["magnetic bubble memories"] is the sensor which converts bits of information, defined by the presence or absence of magnetic bubbles at the output of a channel, to electric signals. This article outlines the requirements which must be met by these reading devices, methods of reading, the design of reading coils for induction reading, and the parameters of reading devices as functions of the parameters of the film carrying the bubbles. Induction and magnetoresistive bubble reading sensors are comparatively simple devices which can produce an output signal suitable for input to semiconductor integrated circuits. The magnetoresistive device is more sensitive, but the induction device is easier to manufacture. This advantage of the induction device is decisive at the present state of development of these memories. Figures 7; tables 1; references 14: 10 Russian, 4 Western.

USSR   UDC 681.3.14./21

TEXT EDITING WITH AN ALPHANUMERIC DISPLAY

IVANOV, OLEG NIKOLAYEVICH, engineer (Moscow), and IOFFY, MIKHAIL PAVLOVICH, engineer (Moscow)

[Abstract] Maximum display utilization effectiveness can be achieved only
if the editor can control all file processing I/O procedures by means of
instructions input from the display; call to the screen text fragments for
selective or systematic inspection of the file in both directions; perform
context-based search for lines in the file on the basis of distinguishing
characteristics indicated by the operator while inspecting the file in both
directions; and introduce changes to text fragments indicated on the dis-
play screen. These principles were used to develop the KADR display text
editor for the M6000 computer. KADR [frame] operates with the SID-1000
display (16 rows of 64 characters), with the top row used for communication
with the operator. The instruction list for file manipulation and editing
is presented and explained. References 4 (Russian).

USSR   UDC 681.3:66.012

SOME CONCEPTS OF HARDWARE IN INTEGRATED AUTOMATIC MANAGEMENT SYSTEMS

CHUKHMAN, V. N., candidate in technical sciences

[Abstract] Hardware integration of automatic management systems--including
decentralizing the computer complex and distributing the computer network
across the enterprise--can increase complex efficiency by 15-40 percent.
Two or more computers in a complex can mean even higher efficiencies. The
M-4030, M-6000, M-7000 and M-400 computers are interfaced with Unified Sys-
tem computers and data acquisition and processing systems based on M-40 and
M-60 equipment. Also interfaced are the ASPI [automated primary data pro-
cessing system], CAMAC, KTS LIUS [hardware complex for constructing local
management information systems] and other complexes. Besides estimating
efficiency gains from integrating automatic management systems, the ripple
effect in such a system from malfunctions, shutdowns and damage imposes much
stiffer survivability and flexibility requirements on this kind of control
system. Also, system expansion in an integrated automatic management system,

in contrast to a nonintegrated system, entails frequent rethinking of numerous linked subsystems. Network linking of management systems faces a centrifugal, enterprise-oriented, and a center-oriented trend, in contraposition. Computer network topologies are described; their advantages and disadvantages are weighed: radial (stellate), distributed (radial with horizontal interfacing), ring (loop) and trunkline, with grouped lines. Further, multilevel integrated management systems are illustrated with structures of systems at metallurgical plants--the most common structure is the dendritic topology. To overcome a drawback of this topology, iterative topologies were designed, using a unified computer complex network and a unified network of terminals "circulating" primary process information. Figures 3; references 11: 9 Russian, 2 Western.

ARRANGEMENT OF FILES IN DIRECT-ACCESS MEMORY

TRIFONOV, YU. V.

[Abstract] A statistical model of the arrangement of files on a disk pack is studied which does not require the assumption that the functional dependence between the number of cylinders intersected and the time of movement of the reading mechanism is linear, or that each file processed is equal in length to one magnetic disk cylinder. Analysis of the task of organization of the arrangement of information shows that the placement of files on disk memory is usually based on intuitive considerations. The optimal placement of files on disks allows program running time to be reduced without significant expenditures of programming time. References 6: 3 Russian, 3 Western.

USSR   UDC   681.326.7

SOME PROBLEMS OF FUNCTIONAL TESTING OF LARGE INTEGRATED CIRCUITS IN MEMORY
DEVICES

DOBROVINSKAYA, D. G., YERMAKOV, V. G., MEL'NIKOV, A. A. and PEREL'ROIZEN,
YE.' Z.

[Abstract] A discussion is presented of the functional testing of LSI memo-
ries. The concept of the effectiveness of functional testing is introduced,
utilizing an informational criterion of functional effectiveness which re-
lates the probability of achievement of the goal to the total cost of test-
ing. The cost is assumed to be directly proportional to the time required
to perform the test. An attempt is made to generate a classification of the
various tests used for functional testing of LSI memories, including the
"traveling one" test, which is stated to be the most rigid test for charge-
coupled devices. Figures 1; references 12: 11 Russian, 1 Western.

USSR

OPTOELECTRONIC COMPUTER

KROKHIN, YU.

[Abstract] Images, not computations, are permutated and logically ranked in
a new kind of computer--the optoelectronic computer. Prototypes of this kind
of computer are under development at the Institute of Control Problems: its
deputy director is dr in technical sciences, Professor I. Prangishvili.
Basic to the optoelectronic computers are a holographic memory-logic block,
a silicon chip-mounted microcomputer and input/output blocks. Information
is fed into the computer in optical form or as electrical signals from sig-
nals transformed into the corresponding optical images with an electrically
controlled overlay. The "picture" formed is scanned by a laser, which then
conveys the information picked up. To interface the microcomputer with the
holographic memory-logic block, the microcomputer crystal has a set of light-
sensitive elements, a kind of visual retina. Most importantly, the memory-
logic block stores pictures and logically processes them on mm^2-sized holo-
grams on crystal wafers, or in a spatially superimposed form, sandwich-like.

The volume optical filter thereby formed holds tens of thousands of picture pairs--"initial situation-action," e.g., "picture of obstacle--trajectory for circumventing it." By associative filtration, real-world pictorial solutions are generated in a real-time scale. Medical diagnosis is an immediate application for optoelectronic computers.

F. Programming and Software

CONSTRUCTION PRINCIPLES AND ARCHITECTURE OF APPLICATION PROGRAM PACKAGE

ZAPOLOTSKIY, DAVID YEFIMOVICH, engineer, NII mekhaniki pri GGU [Mechanics Scientific-Research Institute affiliated with Gor'kiy State University] (Gor'kiy); KARPENKO, SERGEY NIKOLAYEVICH, junior scientific worker, NII mekhanika pri GGU (Gor'kiy); KUZIN, S. G. [full name not given]; PESKOV, VLADIMIR IVANOVICH, junior scientific worker, NII mekhanika pri GGU (Gor'kiy); and SHTEYMAN, DAVID MIKHAYLOVICH, engineer, NII mekhanika pri GGI (Gor'kiy)

[Abstract] The technological principles formulated in this paper for the construction of application program packages (PPP) and the universal construction of a package proposed on a basis of these principles are one of the possible methods of approach to the problem of planning PPP. The universal construction of a package is defined as a set of subsystems. A brief description is given of each subsystem and its functions, purpose and structure are presented. At present, the procedures presented are used for development of PPP oriented to the solution of problems of elasticity theory and problems of radio electronics. Figures 2; references 13: 12 Russian, 1 Western.

FUNCTIONAL POSSIBILITIES OF PROGRAMS OF OPERATIVE CHECK AND RESTORATION OF EFFICIENCY OF REAL-TIME SYSTEMS

TIMOFEYEV, BORIS BORISOVICH, associate member, UkrSSR Academy of Sciences, Institute of Automatics (Kiev); USHAKOV, VIKTOR ALEKSANDROVICH, engineer, Institute of Automatics (Kiev); and KOSTENKO, VASILIY SAVVOVICH, engineer, Institute of Automatics (Kiev)

[Abstract] The paper considers program methods for operative check and restoration of efficiency of real-time systems in an automated management system for technological processes (ASUTP) with a M6000 control computer complex (UVK M6000), which are characterized by rigorous requirements for the indices of reliability and short-time redundancy. A block diagram of the interaction of the programs of check and restoration is shown, and the following items are discussed: 1) Package of programs for operative check and restoration of efficiency; 2) Modules for detecting breaches of efficiency; 3) Modules for acception of solutions, identification and recording of

breaches of system efficiency; 4) Modules for restoration of efficiency; 5) Servicing modules; and 6) Analysis of effective program methods of operative check and restoration. Figures 1; references 9 (Russian).

USSR   UDC 681.3.06 + 65.011.56

CONCERNING AUTOMATION OF MODULATOR DESIGN OF SOFTWARE FOR AN AUTOMATED
MANAGEMENT SYSTEM FOR TECHNOLOGICAL PROCESSES

POGREBNOY, NIKOLAY VASIL'YEVICH, candidate in technical sciences, IES AN USSR [Institute of Electric Arc Welding imeni Ye. O. Paton, UkrSSR Academy of Sciences] (Kiev)

[Abstract] The paper discusses the basic principles for construction of a system of automation of the modular design of a complex of programs (SAMPR-KP), and describes the principal blocks of the system and its operating conditions. The system was developed at the Computing Center attached to the Tomsk Polytechnical Institute, as a means of simulation of the operation and for analysis of the structure of control algorithms, characteristics for a class of uniform objects, and the formation on this basis of a library of universal modules and automation of the synthesis of the software of an automated management system for technological processes (ASUTP) for concrete objects from the class under consideration. Creation of this software is based on a specially developed language of elementary algorithmic functions (EF language). Figures 1; references 5 (Russian).

USSR   UDC 65.015.13

CONCERNING CREATION OF INTERLANGUAGE INTERFACE FOR OPERATING SYSTEM FOR
UNIFIED SYSTEM OF ELECTRONIC COMPUTERS

GRISHCHENKO, VLADIMIR NIKOLAYEVICH, engineer, SKB MMS IK AN USSR [Special
design office (? MMS) Cybernetics Institute, UkrSSR Academy of Sciences];
and LAVRISHCHEVA, YEKATERINA MIKHAYLOVNA, candidate in physico-mathematical
sciences, SKB MMS IK AN USSR (Kiev)

[Abstract] An analysis is made of contemporary languages and software
which assure modular principles of creation of programs on unified systems
of electronic computers. The following basic problems were considered dur-
ing construction of an interlanguage interface: 1) Study of various types
of data in contemporary programming languages (FORTRAN, PL-1, ASSEMBLER);
2) Organization of transfer of control and data between modules in operating
systems (OS); 3) Internal structure of output code of compilers with pro-
gramming languages of OS (assignment of medium; internal data representa-
tion; library of subprograms of compilers with programming languages of OS);
and 4) Automatization of packaging of programs from the initial modules
(standardization of modules, interlanguage interface). Figures 3; refer-
ences 8: 7 Russian, 1 Western.

USSR   UDC 681.3.51./6.42

SOME PROBLEMS OF INPUT AND TRANSLATION OF INPUT DATA IN AUTOMATED SYSTEM
FOR SITUATION ANALYSIS

NEKRASOVA, LEONINA NIKOLAYEVNA, engineer, IK AN USSR [Cybernetics Institute,
UkrSSR Academy of Sciences] (Kiev)

[Abstract] During the solution with the use of electronic computers of
problems of the national economy, difficulties often appear which are con-
nected with the processing of input data, because of the large extent of
their indeterminacy. Problems of forecasting the development of science
and technology, long-term economic plans and many problems of management
of complex items primarily pertain to such problems. One of the means for
solution of similar problems is an automated system for situation analysis

(ASAS) based on a method of system analysis for forecasting purposes advanced by Academician V. M. Glushkov. This system serves for man-machine study of situations which appear during development in time of complex items. The present paper discusses language means of data description in an ASAS, and contains a supporting description of algorithms for syntactical checking and translation of data. The principal characteristics of these algorithms include: 1) The dialogue nature of the work formulated as the performances of the input of the responses of the users and the output of requests of the system; and 2) An automated, under way in the course of a dialogue breakdown, subdivision of the input data flow into two parts: the first part is used for formation of a data base (BD); the second part for conducting a dialogue. Figures 1.

ALEKSEYEV, OLEG GLEBOVICH, candidate in technical sciences (Leningrad); and BABAYEV, ALEKSANDR ALEKSANDROVICH, junior scientific worker (Leningrad)

[Abstract] The paper proposes use of the method of branches and boundaries for the arrangement of arrays in the memory units of electronic computers (EVM) according to the criteria of minimization of the total time of access to these arrays. Program realization of an algorithm proposed for the above purpose is accomplished for the EVM "Minsk-22" and "Minsk-22." Figures 1; tables 5; references 6 (Russian).

USSR

EFFICIENCY OF HOMOGENEOUS REAL-TIME COMPUTING SYSTEMS

LIPAYEV, VLADIMIR VASIL'YEVICH, dr in technical sciences (Moscow); and
SHTRIK, ALEKSANDR ARKAD'YEVICH, candidate in technical sciences (Moscow)

[Abstract] The paper considers the performance of homogeneous multiproces-
sor and multimachine computing systems (OVS), produced for management of
units and technological processes in real time. The homogeneity of comput-
ing systems of the class under consideration is established by the identi-
cal functional and technical potentialities of the processors or machines
which enter into them. The unity of functioning of the complex of steering
programs is assured, either by the overall main memory or by the channels for
exchange of information between them. Particular attention is paid to an
analysis of multimachine and multiprocessor OVS, with allowance made for
the expenditure on the exchange of information and the delay during conver-
sion to the overall main memory. As a function of the system program of OVS,
various criteria for evaluation of efficiency can be used. Evaluations are
obtained for the first of these indicators--the ratio of the performance of
OVS to the total performance of the machine. Multicompressor and multima-
chine complexes are discussed in detail. It is concluded that the efficiency
of an OVS in real time is determined by a large number of diverse factors
which substantially hinder conduct of its evaluation in a general form. An
investigation of the efficiency of multiprocessor complexes which took into
account delays during use of the overall memory, with real values of the
connectedness of programs, showed that losses of performance during this are
sufficiently material, and the possibility of increasing the number of pro-
cessors in the complex is limited. The performance of the class of multi-
machine complexes considered, in addition to delays from use of the main
memory, is limited by the presence of expenditures on the organization and
conducting of intermediate exchange. These expenditures in combination can
lead to an extreme dependence of the performance on the number of interact-
ing machines. Figures 3; references 11: 9 Russian, 2 Western.

USSR   UDC 65.011.56

EVALUATION OF RELIABILITY CHARACTERISTICS OF REDUNDANT CONTROL COMPLEX WITH
AUTOMATIC DIAGNOSTICS

KRASILOVETS, LYUDMILA VASIL'YEVNA, engineer, IK AN USSR [Institute of Cyber-
netics, UkrSSR Academy of Sciences] (Kiev); and NIKITIN, ANDREY IVANOVICH,
dr in technical sciences, Institute of Cybernetics, UkrSSR Academy of Sci-
ences (Kiev)

[Abstract] A number of control systems exist which require practically non-
failure operation. In this case, in order to prevent delivery into the actu-
ators of the controlled object of even a single incorrect command, recourse
is made to a regime of complete duplication of two (and in some cases three)
identical control machines. In the present work an evaluation is made of the
reliability of a system with a special architectural solution, notably with
a function splitting of the system and doubling of operation at the level of
large blocks (modules), as well as with automatic diagnostics of modules
which have failed. Analytical expressions are obtained for some character-
istics of the reliability of the complex described and their dependence on a
number of functional modules is studied. Figures 2; tables 1; references
4: 3 Russian, 1 German.

USSR   UDC 681.3.06./94

THE CHARACTERISTICS OF ALGORITHMS IN CONTROL COMPUTERS

VASILENKO, VYACHESLAV SERGEYEVICH, engineer (Kh'arkov)

[Abstract] An attempt is made at summarization, expansion and combination
into a single system of a number of indicators which can be used for complex
evaluation of algorithms, programs and computers. It is considered that a
number of the characteristics used are defined by such computer character-
istics as speed, memory volume, word length, etc. However, computer char-
acteristics can be considered in the selection of the type of computer in
the stage of development of algorithms, so that it is possible to discuss
the characteristics of the control algorithms themselves, defined by methods
of processing of information, resistance to distortion, selection of con-
stants, correctness of scaling and the skill of the designer. The basic

quantitative characteristics used are the accuracy of construction of the
trajectories of objects, the accuracy of performance of control actions, the
throughput capacity and resolution. The characteristics suggested are not
complete, and may be supplemented by other characteristics, e.g., sensitivi-
ty, defined by the level of quantization noise and internal computer noise.
However, the system as it stands can be used for combined evaluation of al-
gorithms, programs and computers of any algorithmic control system when sup-
plemented by specific functional (quantitative and qualitative) indicators.
Figures 1; references 8 (Russian).

CONSTRUCTION OF THE NUCLEUS OF THE OPERATING SYSTEMS OF AN AGGREGATE SOFT-
WARE SYSTEM

AYZENBERG, ALEKSANDR BORISOVICH, senior scientific research worker, NIIUVM
[Scientific-Research Institute of Control Computers] (Severodonetsk);
SMOLKIN, VALERIY MARKOVICH, senior scientific research worker, NIIUVM (Severo-
donetsk);   FILIPROV, NIKOLAY VSEVOLODOVICH, candidate in physico-mathemati-
cal sciences, NIIUVM (Severodonetsk); and SHCHERBAKOV, YEVGENIY VASIL'YEVICH,
engineer, NIIUVM (Severodonetsk)

[Abstract] A study is made of the basic principles of construction of the
nucleus of the operating system of an aggregate software system (ASPO). The
nucleus contains interrupt service programs, programs for synchronization
of processes and supervision of the distribution of processors in the system.
This article analyzes the basic principles of construction of the nucleus,
as well as specific examples. Some quantitative characteristics of typical
nuclei are presented, including minimum main memory volume (2.5 K-12K16-bit
words, depending upon configuration), minimum interrupt reaction time (100
μS), maximum high-priority interrupt reaction time (820 μS), minimum job
switching time (470 μS) and average job-switching time (1100 μS). The oper-
ating system for the aggregate software system has been accepted by the
State Commission and is now in experimental use. References 4: 2 Russian,
2 Western.

USSR   UDC 681.3.51./6.42

AN INTERACTIVE FORTRAN PROGRAM ACCESS SUPERVISOR

TAYCHINOV, RIGAT SULTANOVICH, candidate in physico-mathematical sciences,
TsNII ekonomiki i truda bumazhnoy prom-ti [Control Scientific-Research In-
stitute of Economics And Operation of the Paper Industry] (Moscow); BOCHAROV,
YEVGENIY PAVLOVICH, engineer, VNIPI OASU [All-Union Scientific-Research and
Planning Institute. Sector Automated Management System] (Moscow); and
PETRAKOV, ALEKSANDRIVANOVICH, engineer (Moscow)

[Abstract] Effective utilization of the rich library of FORTRAN programs
requires the ability to have direct access to this software through communi-
cation channels. This is the job of the interactive FORTRAN program access
supervisor (DIOFP). This supervisor provides the "Minsk-32" computer user
with the ability to produce in-line processing of data wherever they appear
using the computational resources of a remote "Minsk-32" computer with a
library of FORTRAN programs, and to change, within certain limits the formats
of the input and output data without changing the FORTRAN programs. The
supervisor utilizes a "Minsk-1560" communication channel buffer, a magnetic
tape storage device and a punch card reader. The minimum required memory
volume is 20 + N pages, where N is the length of the longest FORTRAN program
to be run, in pages. The functioning of this supervisor is briefly described.
The supervisor is now on line at the Khar'kov Institute of Electronics where
it is used in scientific-research work as well as in an educational process
during conduct of laboratory work. References 3 (Russian).

USSR   UDC 681.3.06:51

A PROCEDURAL MODEL OF AN ON-BOARD DIGITAL COMPUTER

TOMSHIN, VLADIMIR KONSTANTINOVICH, candidate in technical sciences (Moscow)

[Abstract] A procedural model of an on-board digital computer is described,
intended for rapid investigation of algorithms on the computer. This re-
quires that obligatory scaling be abandoned, permitting results with modulo
greater than one, and that programs be written not in the codes of the on-
board computer, but rather that analogues be written in an algorithmic
language. This will allow the investigator to determine the accuracy of

computation, the time required to perform a task and the number of memory locations required. The structure and composition of such a procedural model are described. Using the procedural model, one can also select a system of scale factors, partially optimize object programs for the computer and develop algorithms and programs for the internal software of the computer. The procedural model uses an incomplete description of the computer, which can be composed in various stages of planning of the machine. This means that the procedural model can allow the designer to begin development of the internal software of an on-board computer and the algorithms for operating programs, saving time in the development of the entire computational system. Figures 1; tables 1.

ALEKSANDR DMITRIYEVICH, candidate in technical sciences, IK AN USSR [Institute of Cybernetics, UkrSSR Academy of Sciences] (Kiev)

[Abstract] Programmable logic matrices [PLM] are associative information processing devices. They act as logic filters, transmitting to their outputs only a limited set of the practically unlimited set of input words, as defined by information stored in the matrices. They can be used in recursive computers to distribute jobs among specialized processors, and also for sorting of information for recognition of fixed sequences of words. A new approach is presented in this article to the construction of PLM on the basis of programmable read-only memory, thus eliminating one of the primary defects of previous devices, in that they could not be reprogrammed. The PLM structure described fully utilizes the capacity of a rectangular memory matrix, and can be easily constructed using standard microcircuits. Figures 3; references 3: 2 Russian, 1 Western.

USSR   UDC 681.326

A PROGRAMMING SYSTEM FOR DIRECT PLAN CALCULATIONS

SHIKULA, I. YU., engineer

[Abstract] The system for programming of direct plan calculations (SPPR)
consists of a system language and a batch of programs: input of numerical
information; management of the dictionary; construction of a base file; and
print. This article analyzes problems encountered in the development of a
job-oriented language for programming of direct plan calculations, allowing
an assembler-like language used by the YeS system of computers to be made
more like the language used for description of algorithms, as well as free-
ing the user from the need to program such cumbersome operations as input
and output, formatting of output tables, and creation and management of the
dictionary necessary for the performance of tasks. Samples of macroinstruc-
tions are presented and described.

USSR   UDC 681.3:621-9-52:681.3.06

SOFTWARE FOR NUMERICALLY CONTROLLED MACHINES BASED ON THE SM-3 CONTROL COMPUTER

GORMAN, L. M., KRIVORUK, V. I., MAZO, I. I., engineers; KABALEVSKII, A. N.
and OSTROVSKII, M. A., candidates in technical sciences

[Abstract] The use of microprocessor-based hardware to control the large,
flexible machine tools known as work centers is very desirable from the
standpoint of economy and flexibility; however, numerical control of these
machines requires very fast hardware, capable of performing as many as fifty
thousand interpolation calculations per second. The authors suggest the
SM-3 computer for numerical control of a work center. The SM-3 processor
is selected because of its effective system of instructions with many types
of addressing, its ability to work with bytes, the ease of operation with
structured information such as tables, and the well-developed software, com-
plimenting the architecture of the processor. Experimental studies performed
show the promise of using the SM-3 minicomputer in a numerical control de-
vice, the possibility in principle of programming of shaping algorithms,
and the significant reduction in writing and debugging time achieved in the
process of modification of the algorithm for a specific machine tool caused
by the free programming allowed. Video terminals can be used to edit and
optimize the control of programs. References 1 (Russian).

G. Automated Design and Engineering

INPUT OF GRAPHICAL INFORMATION INTO ELECTRONIC COMPUTER

YULIN, BORIS ILLARIONOVICH, candidate in technical sciences (Moscow);
NAYMUSHIN, GERMAN ALEKSANDROVICH, engineer (Moscow); and SMOLICH, GRIGORIY
GRIGOR'YEVICH, engineer (Moscow)

[Abstract] In the Soviet Union as well as abroad a number of systems have
been created for automated design of printed circuit cards with the aid of
an electronic computer. The present paper is concerned with photo input of
graphical data into such a system. Testing of the photo input was conducted
with the aid of the FAK-DM facsimile apparatus. A circuit for interfacing
the FAK-DM with an M-222 computer is proposed. The software of the photo
input amounts to approximately 30 thousand machine commands. Figures 4;
tables 1; references 3: 2 Russian, 1 Western.

A SEMIAUTOMATIC PLOTTING BOARD FOR CONVERSION OF GRAPHIC INFORMATION TO
DIGITAL CODE

SAKHARIN, VLADISLAV GEORGIYEVICH, engineer, PO "Elektronmash" [? Planning
Department, Electrical Machines] (Kiev); RUMYANTSEV, VIKTOR PABLOVICH,
engineer, PO "Elektronmash" (Kiev); and MAYERGOIZ, ISAAK DAVIDOVICH, dr in
technical sciences, Cybernetics Institute UkrSSR Academy of Sciences (Kiev)

[Abstract] A device is described (see picture) for encoding of graphic in-
formation reflecting the topology of printed circuits. The orientation of
the device to the solution of a
definite range of problems al-
lows optimal combination of the
technical and ergonomic require-
ments for the device. A struc-
tural diagram of the device is
presented below:

H.   Other
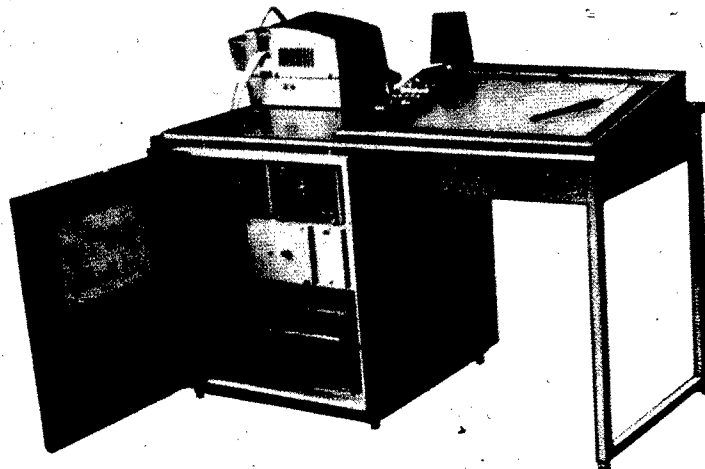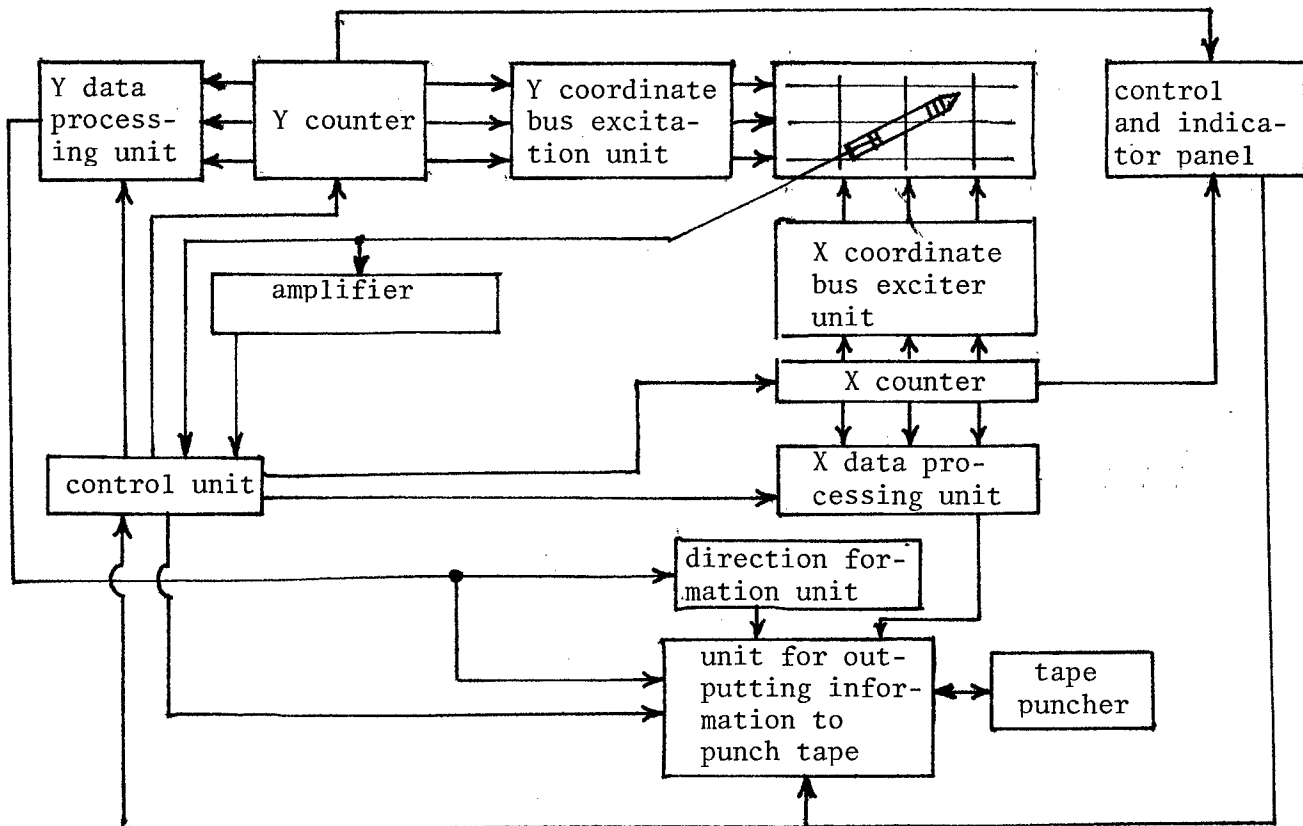
USSR   UDC   681.327

TERMINAL ON THE BASIS OF SID-1000 DISPLAY AND DEVICE OF "PREPAMAT" TYPE FOR
COMPUTER COMPLEXES M6000 OF ASVT-M OPERATING IN ASUTP

Kiev UPRAVLYAYSHCHIYE SISTEMY I MASHINY in Russian No 1, 1978 pp 138-140
manuscript received 11 Apr 77

BALYASNYY, LEONID MARKOVICH, candidate in technical sciences (Khar'kov); and
VOLCHKOV, IVAN IVANOVICH, senior scientific worker (Khar'kov); and KOTOK,
VALERIY BORISOVICH, engineer (Khar'kov)

[Abstract] The paper considers the problem of increasing the efficiency of
operation of computing complex M6000 and ASVT-M (automated system of comput-
ing techniques--M) operating in an ASUTP (automated management system for
technological processes). One of the solutions of this problem consists of
the development of a new terminal, the requirements for which are described.
This terminal was developed on the basis of a SID-1000 (A542-2/1) display
and a UPDP1 (device for preparation of data on punched tape) of the "prepa-
mat" type. Various operating conditions of the terminal and the special
features of design realization of the interface circuit are considered.
Prospective uses of the new terminal in an ASUTP, operating in real time,
are shown. Figures 1; references 2 (Russian).

USSR   UDC   681.328:621.316.544.1-529

PROGRAMMABLE CONTROLLERS, THEIR PECULIARITIES AND DEVELOPMENTAL TRENDS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 2, Mar/Apr 78 pp 86-
91 manuscript received 31 Jan 77; after completion 6 Apr 77

SRIBNER, LEONID ANDREYEVICH, candidate in technical sciences, UkrNIISIP
[expansion unknown] (Odessa)

[Abstract] A study is made of specialized electronic control computers de-
signed to control industrial equipment. These "programmable controllers"
(PK) are used to replace ordinary electric automation equipment and, in con-
trast to this equipment, are universal, specialized by means of programming.
PK are the result of the development and merging of three main trends: com-
puter technology, contactless relay, automation equipment, and cyclical pro-
grammed control of technological equipment. PK differ from minicomputers in
that their system of instructions does not include arithmetic operations
(usually only pulse counting), they can be programmed by shop personnel not
trained in computer programming. They can be used in industrial environments,

they are modular in structure, their programs are usually changed quite rarely, and thus, they stand between electromechanical relay devices and minicomputers in complexity. PK such as the Modicon 184 and Allen Bradley controllers are briefly analyzed as examples of the type. Figures 4; tables 2; references 14: 2 Russian, 12 Western.

II. ECONOMIC APPLICATIONS

A. General Treatment

REGULATION OF EXTERNAL CONNECTIONS AS A METHOD OF ORGANIZING THE INTERAC-
TION OF AUTOMATED MANAGEMENT SYSTEMS

LISITSYN, VIKTOR GRIGOR'YEVICH, candidate in technical sciences, VNIIPOU
[? All-Union Scientific-Research Institute for the Organization of Automatic
Control] (Moscow); MIKHEYEV, YURIY ALEKSANDROVICH, candidate in technical
sciences, VNIIPOU (Moscow); FROLOV, ANDREY SERGEYEVICH, candidate in physio-
mathematical sciences, VNIIPOU (Moscow); and SHYTKIN, LEV'VLADINOROVICH,
candidate in technical sciences, VIIPOU (Moscow)

[Abstract] In the process of development of large systems, a general ap-
proach has been noted toward the organization of their planning, construc-
tion and improvement. The essence of this approach is the formation of in-
terrelated documents which strictly define the external connections of in-
dividual units in the system in the process of performance of the functions
assigned to them. This approach needs to be extended to automated manage-
ment systems (ASU) and to the statewide system for collection and processing
of information for accounting, planning and management. This article ana-
lyzes the principles of construction of the documentation representing the
interactions of AMS. The system for standardization of external connections
of AMS in the statewide network is based on "interface" and "protocol" type
documents. The "interface" of an AMS refers to the set of documents defin-
ing the compatability and rules of interaction of one AMS with another, with
which it must exchange information as it performs its work. The "protocol"
of interaction of AMS refers to a system of documents which define the com-
patability and rules of interaction of one AMS with another, limiting con-
sideration to two-way interaction. The method of regulation of external
connections of AMS based on "interface" and "protocol" documents is current-
ly under development at the Scientific-Research Institute for Material and
Equipment Supply (NIIMTS) and VNIIPOU [? All-Union Scientific-Research Insti-
tute for the Organization of Automatic Control]. Figures 2; references 3
(Russian).

EFFECTIVENESS OF CERTAIN METHODS OF CHECKING THE RELIABILITY OF INFORMATION IN AN AUTOMATED MANAGEMENT SYSTEM

BROYDO, VLADIMIR L'VOVICH, candidate in technical sciences, LIEI [? Leningrad Institute of Economic Investigations] (Leningrad); and IL'INA, OL'GA PAVLOVNA, graduate student, LIEI (Leningrad)

[Abstract] The authors of this article have produced analytic expressions for calculation of the basic characteristics of the correcting capacity of most of the methods for checking the reliability of decimal information currently in use, which utilize the information-syntactic redundancy of messages. These analytic expressions are correct if the development of errors in the information is equiprobable and independent. Methods for testing reliability of information with error detection and error correction are analyzed. The variation of the basic characteristics of the correcting capability of test methods with the probability of distortion of a character is presented in graphic form. Methods with error correction are found to be superior, both from a standpoint of error detection, and from the standpoint of continuity of information processing. Figures 2; tables 3; references 6: 3 Russian, 3 Western.

ADVANCES IN AUTOMATED TECHNOLOGICAL PROCESS MANAGEMENT SYSTEM BASED ON THE USE OF MICROPROCESSORS

VAL'DENBERG, YU. S., candidate in technical sciences

[Abstract] Usually, small computers, such as the M-6000 ASVT (automated system of computer technique), are employed in the computer complexes in automated technological process management systems (ASUTP). The key merits of this kind of system include centralization of the acquisition, storage and processing of information. But this centralization handicaps gains in operating reliability and the interface of process operators with management system units. Centralization conflicts with the growing complexity of process equipment, gains in unit capacity of equipment and faster operating speeds, which is a universal and persistent trend in modernization. This

trend can be circumvented by separating management system functions and assigning each separated function to a smaller part of the system. Functions in monitoring an industrial process include: 1) Primary data processing; 2) Computing ongoing values of parameters; 3) Tracking rates of change; 4) Finding the sequence of the triggering of process safeguards; 5) Computing operational technical-economic indicators; 6) Detecting instances of deviation from set-points; and 7) Operational recordkeeping of the process on the scale of the functional unit. Functions in controlling an industrial process include: 1) Stabilizing parameters on the scale of the functional unit, using proportional, integral and other classic control modes; 2) Two-position control on the scale of the functional unit, relying on logical laws; 3) Automatic maintenance of process set-points on the scale of complex functional units during special control phases; and 4) Updating of operational schedule targets on the functional unit scale. Microcomputers and microprocessors lend themselves to these functions. Typically, by 1977 the TDC-2000 system made by Honeywell was in service with more than 50 applications in a number of countries. Contrary to American computer practice, Honeywell built the TDC-2000 system using its own, dedicated microcomputers, rather than general-purpose IBM microcomputers.

USSR

MANAGEMENT: SCIENCE AND PRACTICE

Moscow PRAVDA in Russian 23 Jul 78 p 2

RUSINOV, F., dr in economic sciences, Professor director of department, Moscow Institute of National Economy

[Abstract] This article is concerned with methods of increasing the efficiency and quality of management. Under the conditions of the ever widening distribution of electronics computers (EVM), it has been necessary for users to impose new requirements on planned EVM and automated production management systems (ASUP) which will make it possible to take social and other factors into consideration. In recent times especially great strides have been taken in the development and use of automated management systems (ASU) at enterprises of various sectors of the national economy. If in the Eight Five Year Plan, 414 ASU were introduced, then in the Ninth there will be 2,364. One of the first to operate efficiently was the "ASU-pribor" of the Ministry of Instrument Making, Automation Equipment and Control Systems. Its first phase solved 74 problems connected with accounting, planning and production management. In the second phase it essentially presented a new stage of sector ASU on a base of third generation EVM, the advantages of which are given in the article. With the aid of "ASU-pribor," up to 12 variations of long-term and 6 variations of annual plans are calculated.

The principal effect from the use of similar management systems, e.g., at machine-building enterprises, is obtained because of a solution of the so-called problems of synchronization. ASU makes it possible to plan production by turns, and at each hour and even minute there is achieved smoothness and proportionality in the actions of the various participants in production. Actions are listed which hamper the creation of a state-wide system of collection and processing of information necessary for exemplary planning and management. A contract and a lasting economic connection developed on the basis of a plan must be considered during development of a progressive administrative technology. However, in practice data processing as a rule is set up as a closed cycle which only assures vertical contact between managers, and the horizontal contact between the shops and the services of plant management is weak and unreliable. Consequently, it is necessary to consider an organizational structure which assures vertical and horizontal contact and makes it possible more fully to utilize computer technology. The problem is successfully solved only by the development and introduction of complex management technology. The principle of large-scale production--to separate every production process into its component elements--produced contemporary technology, under which is understood not a science concerning the means and tools of labor, but a process of formation of management organs. It demarcates technology into natural and social, and the latter is separated into operations and elements. Social technology must be planned and introduced only with allowance made for the psychological and physiological features of man. In order to increase the efficiency of management it is necessary first of all to optimize the formation of industrial, scientific-industrial and other complexes which provide complex development of sectors and economic regions. In addition, it is necessary to construct an objective system of evaluation of the efficiency of the activity of the management apparatus, to develop models of management for sectors of the national economy, economic regions, territorial-industrial complexes, associations and enterprises, and to introduce standardization and unified documentation with respect to the technology of management. Problems are listed, the solutions of which already concern the institutes: National Economy imeni G. V. Plekhanov, and Management imeni S. Ordzhonikidze in Moscow; Kiev and Sverdlovsk National Economy; and Leningrad finance-Economics.

USSR

RESEARCH ON AUTOMATED MANAGEMENT SYSTEMS IN PROGRESS AT RIGA PLANT

Riga SOVETSKAYA LATVIYA in Russian 8 Aug 78 p 2

[Text] Riga--Young specialists at the VEF (Riga State Electrotechnical
Plant of the Order of Lenin imeni Lenin) Plant are doing a great deal for
the improvement of technology. They are actively participating in the in-
troduction of automated management systems (ASU).

Shown in the photograph: Head of the Bureau of the Information-Computer
Center Aleksandr Krivchenkov (right) and Senior Engineer Mikhail Gavartin
working on the next ASU complex.

Многое делают для совершенствования технологии, организации производства молодые спе-
циалисты завода ВЭФ. Активное участие принимают они, в частности, в работе по внедре-

B. Bloc Cooperation

COOPERATION OF THE COUNCIL FOR MUTUAL ECONOMIC AID MEMBER COUNTRIES IN THE CREATION AND INTRODUCTION OF MATHEMATICAL METHODS AND COMPUTERS TO AGRICULTURE

KUNTS, YA., engineer, candidate in technical sciences, Administrator of Coordination Center for Development and Introduction of Mathematical Methods and Electronic Computers to Agriculture, CSSR

[Abstract] A history of the cooperation of the Council for Mutual Economic Aid member countries in the creation and introduction of mathematical methods and computers to agriculture is presented. The coordination center itself was created on the basis of an agreement signed by the member countries in 1971. In 1971-1975, the primary thematic areas in the program of scientific and technical research included theoretical and methodological problems of improvement of planning in agriculture by the use of the methods of mathematical economics and computer technology, as well as methodological problems of modeling considering the time factor. The proposed development of cooperation for 1976-1980 includes development of the scientific principles and concepts of the creation of automated management systems (ASU) in agriculture, development of such ASU at the national and oblast levels, and development of ASU for individual agricultural enterprises.

ROBOT WELDERS

MEN'SHIKOV, V., Berlin

[Abstract] This article is a report by a foreign correspondent in East Germany concerning the work of the Central Welding Institute in Halle, GDR. In its quarter century of existence, the Institute has undertaken over 10,000 research projects, and has developed 6,250 new processes and 905 items of new equipment. An average of 60 patent applications are submitted by the Institute each year. An automatic welder is discussed, described by the Director of the Institute as the first generation of the welding robots. The welder was tested in 1977 at a motor vehicle plant in Zwikau. The robot is controlled by an operator from a control panel, and automatically welds parts of the "Trabant" automobile. Introduction of the robot is reported to have

improved the quality and accuracy of welding and increased the productivity of labor by 30 percent. Particular note is made of the close cooperation between the Central Welding Institute and the Electric Welding Institute imeni Paton of the UkrSSR Academy of Sciences. The International Trade Fair at Leipzig this spring included the "intermigmag" welding machine, created by the joint efforts of scientists from the USSR, East Germany and Bulgaria. The area of cooperation with the Soviet Union is continuing to expand.

C. Extractive Industries, Fishing

SITNIKOV, M. V., engineer

[Abstract] The requirements to be met by data display facilities in the
coal industry are discussed, and it is pointed out that in many cases some
of the simplest displays are most effective. An examination is made of
techniques for realization of simple displays such as mnemonics, charts,
tables and the like on the basis of optical transmission elements (light
guides), incandescent lamps, light filters and masks. Monitoring of various
states of the control object is provided by colored lights on the display.
The latest advances in transparent and colored plastics as well as miniature
high-intensity bulbs make it possible to produce facilities of this kind with
optical characteristics comparable to those of gas-discharge and LED displays.
Technical specifications are given on the UMI-M and UMI-T plug-in mnemonic
light-pipe display modules developed by the Moscow Giprougleavtomatizatsiya
[State Planning and Design, and Scientific-Research Institute for the Automa-
tion of Operations in the Coal Industry]. Tables 2; references 3 (Russian).

D. Manufacturing and Processing Industries

POLAND

COMPUTERIZATION OF H. CEGIELSKI METAL INDUSTRY PLANT

BERNATOWICZ, KRYSTYN

[Text] Next to mines, steelworks and shipyards, The H. Cegielski Metal Industry Plant is a leading facility of the national economy. The H. Cegielski Plant is a credit to the Poznan industry. It has great traditions and creditable history, and at present it is a very modern enterprise of European reputation.

Contrary to current opinions that it is impossible to manage a large enterprise without the use of computers, the H. Cegielski Plant was satisfied for many years with medium and large mechanization. It is difficult to say whether it was caused by a strong tradition or to some objective reasons. Perhaps the leisurely attitude of the Railroad Rolling Stock Industry also had something to do here. This way or that it was H. Cegielski which became the first enterprise of the Association to acquire a computer. It does not mean, however, that H. Cegialski only then became familiarized with information science.

Already in 1955 two punched-card machines (MLA) were installed there, to be replaced three years later by four more modern ARITMA, and at the turn of 1967-1968 the computing potential of H. Cegielski was further reinforced by three alphanumeric tabulators. Finally, in 1970, an electronic DP-100 tabulator was put into operation. In the course of time the electronic tabulators were withdrawn, which was made possible by the impending implementation of a contract concluded for the delivery of a computer.

At that time the Electronic Computing Technology (ETO) Department of H. Cegielski Plant was undergoing a number of organizational and structural reorganizations, which were crowned by a merger with the MLA Station and by creation of the Plant Data Processing Center. These metamorphoses of information services at H. Cegielski were closely connected with a process of modernization of the methods of management of the Plant. This process resulted in an increase of information services. Between 1960 and 1975 the number of punched cards processed by equipment of the Center increased more than twofold to nearly 5 million. At this period of time the cadres had also dynamically increased: from 18 persons employed at the MLA Station in 1955—through 68 persons employed at the Station and the ETO Department together—to 226 persons employed at the Plant Data Processing Center (ZOPI) in 1975.

The staffing of ZOPI was not an easy matter, both because of steady increase in tasks performed using conventional equipment and in connection with the expected delivery of computer. Since long ago Poznan experienced a considerable shortage of computer scientists. This has been the result of a great

demand in the labor market and of shortcomings in the academic training of specialists in information science. Because possibilities of internal enrollment—through the shifting of workers from other services to ZOPI—were for many reasons limited, H. Cegielski considered that the best method would be hiring "raw" graduates from the adjacent disciplines (economics and mathematics) and subjecting them to intensive training. In this way it has been possible to fill the demand for programmers. It was much more difficult to complete teams of analysts, systems designers, and electronic engineers. This was achieved (especially in case of systems designers) through the internal enrollment. Of great help here undoubtedly were numerous training programs conducted for the potential users of ETO, both basic training (among others within the framework of the TKI [expansion unknown], and specialized training for the operation of concrete systems. After the absorption of a proper amount of know-how, the workers of H. Cegielski increasingly became "infected" with enthusiasm and augmented the cadre of system designers and analysts.

At the time of signing of the contract for delivery of the computer the ZOPI already numbered 147 workers, and the enterprise was through with medium mechanization and with the program for the implementation of comprehensive computerization into the system of management and organization.

Care was taken to make contents of the contract comprehensive with well negotiated details. The contract was concluded with the well known British ICL firm and related not only to the delivery of a 4/72 computer but also to a previous preparation of the infrastructure; adaptation and outfitting (including air conditioning) of the hall for the computer, and the supply of a device for loading magnetic tapes with data. While waiting for the implementation of the contract the time of designers and programmers was not wasted; they were testing the systems worked out on computers of the Gdansk ZIPO [Informatics Center of Shipbuilding Industry]. Therefore, organizationally ZOPI was very well prepared for the use of computers.

Admittedly, it is said that ICL had rather rapidly judged its product, in the form of system 4, to be not quite perfect (which is confirmed by a gradual discontinuation of its production); in the H. Cegielski Plant, however, its virtues are highly appraised. It also is the only computer of this class installed in the CEMA countries, and it is faster than computers owned by ZIPO and by the Szczecin Shipyard, which are half-brothers of the 4/70. The configuration, in which it has been installed at Poznan, is adequately developed as follows: internal (operating) store—262 kB, communication processor and a large external store: 7 disk units of 30 MB each, and 8 tape units. Moreover, the input/output unit has been doubled—2 line printers, 2 punched card readers, and a paper tape reader-puncher. In the near future the system will be supplemented by a network of display and teleprinter terminals. Admittedly, because of the use by the H. Cegielski of dual cards, and continued utilization of MLA, punched cards will still serve for some time as a basic data carrier, the future, however, will belong to magnetic tapes. Within the framework of the contract for delivery of the

system, instead of the KEY-EDIT unit suggested by the British, ZOPI has acquired the SEECHECK made by REDIFON. For the time being it is a modest system composed of one central unit and eight stands. As the transition will take place from punched cards [to magnetic tapes] this system will be expanded.

As follows from the data quoted, at the cost of about one million pounds, ZOPI, and therefore the H. Cegielski Plant as well, has added to its possessions a needed tool for organization and management. It is true that the implementation of the contract seemed interminable, but taking into consideration that thanks to this the required parameters of the installation were achieved, and that during this period of time the programming work was advanced, it appears at present that the proposed tasks have been fully accomplished, the more so as the installed system does not cause any trouble in operation. In a short time the firm's MULTI-JOB operational system, which makes it possible to perform the multiprogramming work, has been developed, and in a near future multiaccess work will be also made possible. The first display terminals were likewise installed.

A last device installed at the H. Cegielski Plant, which cannot be passed over in silence, is the 56/20 N system of the ORMIG firm. It is a link which connects the process of preparation of the workshop documentation with the data processing. It is a modern system for the collection of the source data. This device emits punched cards and workshop documentation of the following types: control card, route card, disposable card. Punched cards which are the by-product of the above-mentioned emission of documentation can be then directly used in the data processing system as the input data.

The 56/20 system reduces by 70 percent the punching and verification time in the labor-consuming preparation of data on the punched cards. The punching and verification of data is reduced to supplementation of information about work performed, such as, for example, the worker's call number, time of execution of the element, number of pieces, etc. The punched and described cards form a closed cycle in the system together with a set of workshop documentation on formats A4 or A5. At the H. Cegielski Plant the 56/20 system will also be used for duplication of workshop documentation (disposable card, route card, job card, materials receipt). The emitted documents will replace the hitherto used dual cards over which they have an advantage anyway because they have literal-digital description and a quick access to the magnetic store plate and store card, which guarantees fast preparation of documentation together with punched job cards and materials receipts.

Main areas of the application of electronic computing technology at the H. Cegielski Plant will be spheres of basic activity of the plant, that is, planning and production control. At present in the first place ZOPI conducts design and implementation work on the following systems: technical preparation of production, management and control of production run, materials management, and employment-wages management.

Just now the following subsystems are being implemented:

- worktime unit norms
- worktime cumulative norms (for single products)
- workplace file _
- materials items c prices file
- materials items quantity and turnover file
- materials consumption and sales account
- materials quantity and turnover accountancy

A number of further subsystems are in preparation. The rapid extension of electronic computing technology to other vital areas of the Plant is conditioned by an active participation of future users of systems, not only in the process of their design but also by suggesting them. Thus far the majority of suggestions arose in ZOPI. It seems, however, that this is only a question of time and not very remote either. The part played for over 20 years by mechanization and automation of data processing in the functioning of the plant permits us to assume that computer innovations enjoy the full confidence of workers of the Cegielski Plant.

Captions (1-6) by St. Adamkiewicz

1. Chief of ZOPI, engr. Waldemar Stroinski, M.A., has put a great deal of energy and enthusiasm into development of informatics at the the Cegielski Plant.

2. Long-awaited ICL 4/72 computer fills a spacious hall. Adaptation work performed by the British was met with great approbation by hosts.

3. A team of electronic scientists--from left: engr. Zenon Przybylski, engr. Marek Jaworski, M. A., engr. Waclaw Baehr, M.A.--does not experience the troubles which worry other centers. The computer thus far has acquitted itself very well. We must remember, however, that the team has been carefully trained by the producer.

4. The installation of ICL terminal heralds the placing into operation in the near future of a teletransmission network. Around it is assembled a team of programmers: Halina Zawirska, M.A., Stefania Andrzejewska, M.A., Ryszard Ciemniejewski, M.A., and Jacek Cyprych, senior programmer.

5. Because of complicated type of production at the H. Cegielski Plant, the systems analysts perform extremely vital tasks. In the photograph are shown: Wieslaw Lechowski, M.A., chief analyst (in the middle of the group). and then, from left: engr. Andrzej Bakowski, M.A., Ryszard Czerniak, M.A., Ewa Jezewska, M.A., and engr. Jacek Kruszewski, M.A.

6. Basic software of the computer and firm's software packages are taken care by the team shown assembled on the photo: Andrzej Chybiak, Ryszard Cieslak, M.A., Bogdan Pilawski, M.A., and Marian Naskret, M.A.
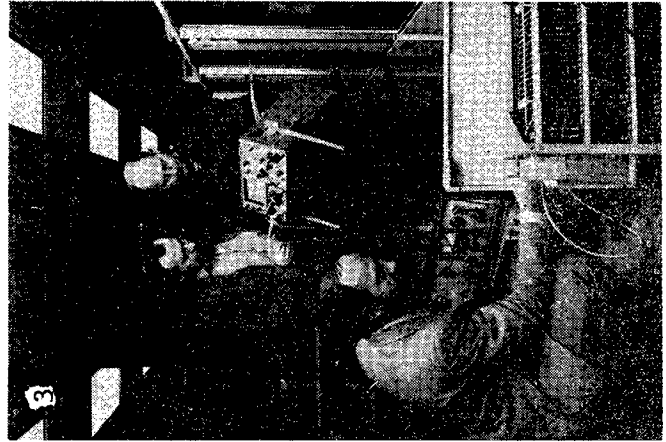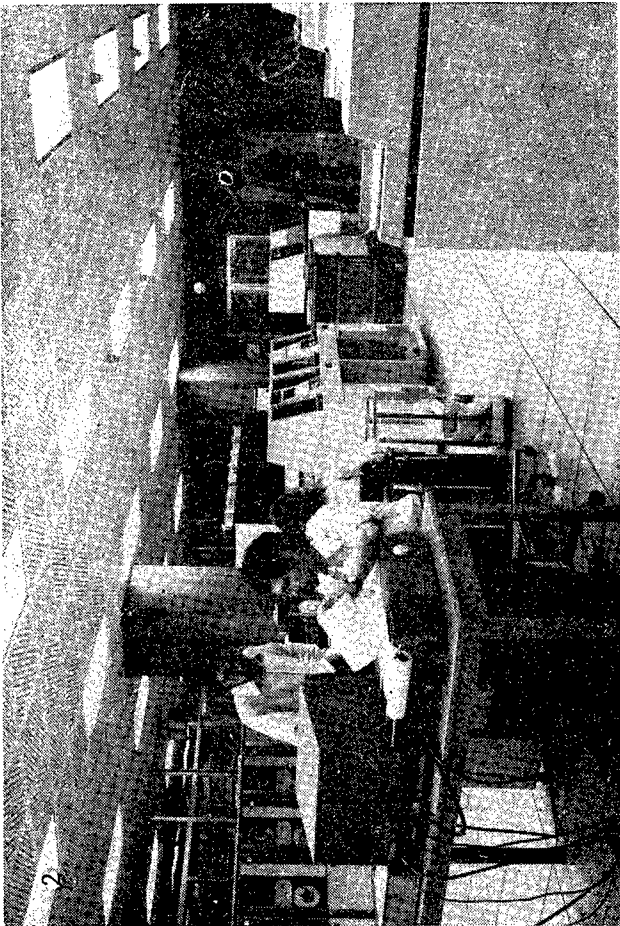
USSR   UDC 658.5.011.56

THE USE OF THE "DEFLECTION PRINCIPLE" IN THE AUTOMATED MANAGEMENT SYSTEM OF
MACHINE BUILDING ENTERPRISES WITH LONG SERIES AND MASS PRODUCTION

MELAMED, GAVRIIL ISAROVICH, candidate in technical sciences, Minsk Polytech-
nical Institute (Minsk); and TREMBOVOL'SKIY, BORIS LEONIDOVICH, engineer,
Minsk Tractor Plant (Minsk)

[Abstract] When process management systems in real time are applied to mass
production situations, the volume of calculations required increases greatly
if the system is to keep a running account of the number of intermediate
products ready for further assembly at the input of each shop. The authors
suggest that the input and output files for each shop be based on the "prin-
ciple of deviation," in which the basic number and version of each inter-
mediate product is assumed present, with only deviations from standard con-
figurations or numbers actually stored and processed. However, this princi-
ple is not allowed by the applicable state standard (GOST 2.113-75). The
authors suggest that this bureaucratic difficulty be avoided by subdividing
the set of intermediate products into a number of homogeneous (based on the
maximum possible standardization) groups within which the method can be ap-
plied without violating the state standard. Two algorithms for application
of the method are presented.

USSR

SERIES PRODUCTION OF ROBOTS AND MANIPULATORS BEGUN AT MOTOR VEHICLE ASSOCIA-
TION

[Text] Series output of industrial robots and manipulators has begun at the
Association "AvtoVAZ" [expansion unknown]. They will position parts for ma-
chine tools, remove incandescent blanks from under dies, weld and paint auto
bodies, and even put together certain subassemblies. The new manipulators
are capable of working with parts of various configurations. In order to
change them over from one operation to another, it is sufficient to intro-
duce "corrections" into their program from the control panel.
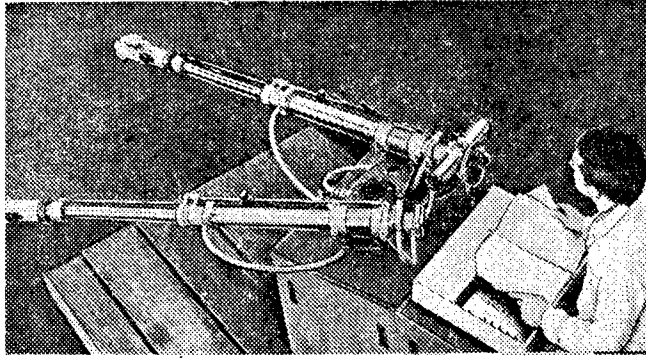
USSR

VEF PLANT CONSTRUCTING AND IMPLEMENTING NEW ROBOTS

Moscow PRAVDA in Russian ["Good for You, Robot!"] 30 Aug 78 p 6

MESHKOV, O., PRAVDA correspondent

[Abstract] A robot constructed by specialists of the Riga Order of Lenin State Electrical Engineering Plant imeni Lenin [VEF] has gone into operation at that enterprise. According to D. M. Rekis, deputy director of a division of VEF's Special Design Technological Bureau, the robot has been assigned one of the most complex operations at the plant--punch pressing of parts for telephones. Specifically, it puts caps of microphone insets on the punch press at the rate of 17,000 parts per shift--almost double manual output and without errors. A system of traveling switches which send signals to the command device, responds only when the plate is placed accurately in the working area.

VEF designers give credit to the staff of Kuybyshev Polytechnical Institute, whose model of the robot "Strela-3" was the starting point for the creation of the punch-press robot.

Specialists in the VEF Plant's New Technology Workshop are now working on five more robots, even more advanced than their predecessor.

DEVELOPMENT OF THE OPTIMAL ANNUAL PRODUCTIVITY OF A SHIPBUILDING PROGRAM OF AN ENTERPRISE ON THE BASIS OF "NON-SHIP ORDERS"

BATURA, ALEKSANDR IOSIFOVICH, engineer, Nikolayev Computing Center (Nikolayev)

[Abstract] The non-ship orders of a shipbuilding enterprise such consumer goods, interplant shipments, agricultural products, chemical equipment and other products, may amount to a 8-25 percent of the total planned production volume of the enterprise. The task of development of the production program of a shipbuilding enterprise as concerns non-ship orders is studied in some detail. The following limitations are considered: the annual quantity of the main types of products must be no less than that assigned in the plant directives; the volumetric indicators must be no less than that assigned in the directives; the volumetric indicators must be no less than that assigned in the directives; the production program must be distributed so that it can be achieved by the available labor resources. The following initial data are used: specific values of labor consumption of products by ships; labor consumption and cost of manufacture of products; the throughput capacity of ships after subtracting the production program for ship orders; the annual quantity of the main types of products defined by the directives. A mathematical model is generated and analyzed. The model produces the optimal production program of a shipbuilding enterprise for non-ship products. References 4 (Russian).

ONE ALGORITHM FOR PRODUCTION OF CALENDAR PLAN SCHEDULES OF EQUIPMENT OPERATION BY COMPUTER

POZIN, SEMEN MARKOVICH, engineer, Odessa Affiliate of Kiev PKB ASU [Planning and Design Office. Automated Management System] (Odessa)

[Abstract] The calculation of the shift-day plan for shops with short-run and individual production represents a difficulty in that each product has its own unique manufacturing technology. A method is suggested for solution of the problem of construction of a calendar plan which involves the selection of the sequence of operations to be performed at each working position,

in a conflict situation, in accordance with the weight functions of the operations, an argument of which is the time remaining until the product is completed. The algorithm is best used where the cycle of completion of most products is over 1 month. The number of batches of parts worked on machine tools should be much greater than the number of machine tools, each part requiring a number of technological operations. The author thanks L. I. Volkov, D. O. Muchnik, S. M. Blyukher and L. A. Pavlenko for assistance in the work. Tables 1; references 4: 3 Russian, 1 Western.

COMPUTER SOLUTION OF THE PROBLEM OF DETERMINING SHIP LOCATION FROM DECCA RADIO NAVIGATION DATA

STAFEYEV, A. M. and TSYMBAL, N. N., Odessa Higher Academy of Marine Engineering

[Abstract] An algorithm is proposed for computer solution of the problem of determining the location of a ship from data provided by a Decca hyperbolic navigational system. The problem is solved in two stages with manual input of receiver data. On the first stage, the dead-reckoning position readings are calculated with respect to all stations, eliminating the ambiguity of readings inherent in all systems of the Decca type. Then the corrected Decca receiver readings are fed to a minicomputer which calculates the observational position of the ship. Figures 1.

USSR

AUTOMATED MOTOR TRANSPORT MANAGEMENT SYSTEM DESCRIBED

Minsk PROMYSHLENNOST' BELORUSSII in Russian ["Automation for Motor Transport"] No 6, 1978 pp 28-31

TSIBULIN, N.

[Text] The introduction of new methods of management using means of computer technology and communications in the system of Minavtotrans BSSR [Ministry of Motor Transport, Belorussian SSR] was preceded by the establishment in each oblast center of computer bureaus (mashinoschetnyy byuro) equipped with keyboard accounting machines (SKM), and in Minsk--mechanized accounting centers having three sets of perforated media accounting machines (SPM) and the required set of SKM. It is not difficult to guess that we are talking about the "OASU--Avtotransport" [sector-wide automated system for management of motor transport], the technical provisioning of which is based on a hardware complex (KTS), which includes EVM [electronic computers], SKM, SPM, and means for transmission of information. The "OASU-Avtotransport" services all levels of management: ministry--motor transport administration--motor transport establishment.

At the ministry level, information is processed by the main computing and information center (GIVTs) located in Minsk. In addition, the GIVTs processes information for the motor transport administrations, ATKh [motor transport facilities] and enterprises in Minsk and Minsk oblasts.

At the level of oblast production motor transport administrations, information is processed by multiple-user information and computation centers (KIVTs). They process information of the ATKh which are a part of the motor transport administrations.

The GIVTs and KIVTs in the motor transport establishments of the motor transport managements of oblast cities have affiliates (peripheral stations) equipped with SKM, at which information is preliminarily processed. In rayon centers, this work is performed by local information and computing stations of the TsSU [Central Statistical Administration] of the BSSR. The accumulated information is then transmitted to the GIVTs and KIVTs.

Organizationally, the KTS is concentrated in the "Avtotranssistema" [motor transport system] production-technical association, which makes it possible to ensure unity of methodological and organizational guidance of operations for introduction and functioning of the OASU; centralization of KTS maintenance; and improvement of the indicators of the operation of the entire computer system on the basis of centralization of the major operational functions.

The KTS provides for handling 117 tasks of the "OASU-Avtotransport," its introduction saves 1.033 million rubles, and the pay off period is three years. In addition, the use of computer technology during the last Five-Year Plan alone averted an increase in the number of accounting personnel in the industry by 2,500 to 3,000 people.

Development of the second stage of "OASU-Avtotransport" has been underway since 1973. Its introduction will make it possible to embrace more extensively processing of information of motor transport facilities and industrial enterprises of the sector, as well as to expand the handling of optimization tasks in all levels of management. The second section will be based on third generation computer and communications hardware, which makes it possible to use more efficient technological schemes for information processing.

In the future, the "OASU-Avtotransport" will become part of a time sharing computer system (VSKP) which will also unite the sector ASU [automated management systems] of the Mindorstroy BSSR [Ministry of Road Building, BSSR] and the Glavrechflot BSSR [Main Administration of the River Fleet, BSSR]. The unified complex of technical means of the VSKP will be developed on the base of the VTs [computation center] of the Minavtotrans BSSR and the peripheral stations for processing information of all three sectors. The development of the VSKP will make it possible to reduce outlays for design, introduction and operation of systems; to make more efficient use of KTS; to accelerate periods of introduction through maximum possible standardization of design solutions, etc.

The estimated savings from introduction of the second section of the "OASU-Avtotransport" exceeds 1 million rubles.

Along with the work underway on the development of the "OASU-Avtotransport," a broad range of problems is being solved in the ministry on the development and introduction of automated systems for management of industrial processes, in which both standard as well as specially developed computer and communications hardware will be used.

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USSR

AUTOMATED MANAGEMENT SYSTEM TO AID IN MARINE AND INLAND TRANSPORT

Moscow VODNYY TRANSPORT in Russian ["ASU--Water Transport"] 29 Jun 78 p 2

SEMANOVA, YE.

[Abstract] The article discusses the increasing complexity of planning and management of the water transport process and the eventual introduction of an automated management system (ASU) to aid in resolving the problems involved.

Reasons given for the complications are the constant increase in the number of shipments, vessels in use, transport equipment, and increase in communications with clientele as well as the growth in flow of production-economic information and the decline in time allowed for processing this information.

The Transport Pavilion at the VDNKh (Exhibition of Achievements of the National Economy of the USSR) is mentioned as being a source of information about the developing technology of ASU the contemporary electronic computer technology used in them.

It is hoped that the introduction of ASU will widen the field of problems available to be solved by management and free workers in the management field from many routine tasks. Such systems could aid in discovering poorly moored vessels and control reserves. The author proposes use of ASU in plants as well as in steamship navigation and ports.

USSR

AUTOMATED MANAGEMENT SYSTEMS: PROBLEMS AND PROSPECTS

Moscow VODNYY TRANSPORT in Russian ["Marking Time"] 8 Jul 78 p 2

GLEBOV, A., chief accountant, Moscow southern port

[Abstract] With this issue, the editors of Vodnyy Transport open a new feature: "ASU (Automated Management System): Problems and Prospects." Items will be published which tell about the introduction and management by the merchant marine and river fleet of the most recent achievements of science and technology and the contemporary methods of leadership connected with them. The editors invite readers to take part in raising questions, and in their consideration. The present article is concerned with the short-comings and activities, now and in the past of the ASU of Moscow southern

port, and the Mechanized Accounting Center (Fabrik mekhanizirovannogo scheta), which includes a Main Computing Center (GVTs), of the Ministry of the River Fleet. The writer concludes that today, when scientists say that nothing so quickly increases in cost as time and when one generation of computers replaces another, the specialists of the port's ASU and GVTs MRF are marking time.

USSR

COMPUTERIZED AIR TRAFFIC CONTROL CENTER COMPLETED IN UKRAINE

Moscow IZVESTIYA in Russian ["Electronic Dispatcher"] 12 Aug 78 p 3

GLUSHETS, I.

[Text] Borispol's Airport in Kiev has completed its Center for the Computerized Air Traffic Control System. Electronic computers will receive data from on-board airliners and instantaneously issue exact coordinates to which aircraft above Kiev must adhere.

Ye. Sizonenko, head of the Department for Operation of Radioengineering Equipment and Communications of the Ukrainian Civil Aviation Administration, comments: "This is one of several directions for introducing automation and electronics at the republic's airports. We were the first ones in the country to develop a computerized landing system. Small computers installed on board airliners process information from the airport."

USSR

GLAVRECHFLOT HAS COMPLEX FOR PROCESSING DEVELOPMENT RECORDS

Moscow IZVESTIYA in Russian ["Electronic Designer"] 25 Aug 78 p 1

GLUSHETS, I.

[Abstract] Kiev--A complex for automated processing of development records has been developed and introduced at the Planning and Design Bureau of Glavrechflot [Main Administration of the River Fleet] for the Ukraine. The computer will function as a designer, calculating and determining the types and quantity of materials necessary for the ships' facilities. The complex will shoulder the uncreative and least productive tasks involved in engineering labor. Computer programs have already been developed which produce accurate calculations of general vessel stability and mechanization of all early phases of design.

POLAND/CZECHOSLOVAKIA

POLISH R-32 AT CZECHOSLOVAK TEPLOTECHNA ENTERPRISE

ZAVESKY, JIRI, TEPLOTECHNA, Prague, Czechoslovakia

[Abstract] Operating experiences on the use of the Polish R-32 computer
installed at the Czechoslovak TEPLOTECHNA enterprise which specializes in
building industrial facilities are described. The specific needs of Czecho-
slovak customers relating to hardware and software and the problems encoun-
tered in connection with the use of R-32 computer are described in detail.
TEPLOTECHNA has previously made use of the Swedish DATASAAB D-21 computer.
The R-32 computer is manufactured by ELWRO [Wroclaw Electronic Plants] and
belongs to JS EMC [Uniform System of Digital Computers] family. The other
members of this family introduced in Czechoslovakia are the R-40 manufac-
tured by GDR and the R-30 of Soviet production.

POLAND

PRESENT CONDITIONS AND DEVELOPMENT TRENDS IN USE OF ELECTRONIC COMPUTERS
IN BUILDING DESIGN

ROBAKIEWICZ, MACIEJ, Research and Design Center of Industrial Building
Engineering BISTYP, Warsaw

[Abstract] The present conditions and principal trends in the development
of computerization of building engineering in Poland and the use of elec-
tronic computers in building design, organization and economical calcula-
tions, functional and spatial design, automatic drawing and data processing
for design purposes are described. Requirements for hardware and software,
organization, and methods of implementation of the program are discussed.

[Dr., engr. Maciej Robakiewicz, graduated in 1951 from Civil Engineering
Faculty, Gdansk Polytechnic. Designer and head of design laboratories of
PROZAMET, PROZAMET-BEPES and BIPROMASZ projects in Warsaw. From 1965 on,
participated in work on computer use in designing. In 1970 took his doc-
tor's degree at Warsaw Polytechnic. From 1972 on, Dy Director for scientif-
ic and research matters at Research and Design Center of Industrial Building
Engineering BISTYP. Also directs a ministerial project on the "Improvement
of Methods and Techniques of Design," and is Chairman of the Commission of

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the Specialized Center of Cooperation and Coordination of Industrial Sectors, for application of ETO [Electronic Computing Technology] in building engineering design. Dy Chairman of the Main Commission for Information Science PZITB. Author of several works, among others on methods of design and applications of ETO in designing. Was Chairman of the Conference on Computer Use for Designing in Building Engineering INFOPRO 77 held in May 77 in Kudow Zdrój.] Figures 4 and photograph of author.

USSR

NEW AUTOMATED MANAGEMENT SYSTEM DEVELOPED AT MOSCOW INSTITUTE

Moscow IZVESTIYA in Russian ["Electronic Computer Controls"] 13 Aug 78 p 1

SIMONOV, V.

[Text] Moscow. An institute of the Ministry of Rural Construction of the USSR--TsNIIEPsel'stroy [Central Scientific Research Institute for the Experimental Design of Rural Construction] has developed the automated management system "ASU--Kontrol'-2." This system will monitor the progress of work towards particularly important objectives. Data from points throughout the country are being collected by the computer. Planning indices and information concerning supplies of equipment are included in its memory. Presently nearly 500 objectives are being monitored with the aid of the computer.

USSR

NEW COMPUTER CENTER FOR RURAL CONSTRUCTION MINISTRY

Frunze SOVETSKAYA KIRGIZIYA in Russian ["On the Shoulders of the Machines"] 2 Sep 78 p 4

ZADORSKIY, F.

[Abstract] A Computing and Information Center is being established for the Ministry of Rural Construction, Kirgiz SSR. The premises for the center are already being remodeled and the equipment has been acquired; preparation of computer programs is going on concurrently. When the center goes into operation it will serve as the physical base for an automated management system for the rural construction sector of industry.

G. Supply System

EVALUATING THE EFFECTIVENESS OF AUTOMATING ESTABLISHMENT OF TIES BETWEEN
SUPPLIERS AND CONSUMERS

TIMON'KIN, B. V., engineer

[Abstract] The problem of economic optimization of transportation between
suppliers and consumers is considered. Sources of economy in automating
routing between suppliers and consumers include reduction in the manual pro-
cessing of information, increasing the number of carriers free to handle
shipment, and cutting unsold inventories as well as more efficient satisfac-
tion of consumer demand. A method is proposed for calculating the savings
realized from these sources of economy. Calculations by the proposed formu-
las are compared with figures obtained by the procedure recommended by Goss-
nab SSSR. The results show that the proposed method takes more complete con-
sideration of savings in reduced routing and transport costs. Tables 1;
references 6 (Russian).

POLAND

APPLICATION OF ELECTRONIC COMPUTERS IN COMMERCIAL ENTERPRISES

JERCZYNSKA, MARIA, Institute of Domestic Trade and Services, Warsaw

[Abstract]   The results are analyzed of the questionnaire surveys relating
to the present state of the use of electronic data processing (EDP) methods
in commercial units of the Ministry of Domestic Trade and Services.   The
surveys were conducted in 1976 by the Institute of Domestic Trade and Services
(IHWiU) and covered 30 percent of users of EDP methods in the State trading
and 100 percent of their users in the cooperative trade.   The EDP methods
were applied to goods turnover and were in use for at least one year.   Com-
pared to analogous surveys carried out by the IHWiU in 1971, the range of
EDP systems has increased in the case of analyses and for planning purposes
but complete automation was not yet fully achieved.   The results are tabu-
lated, analyzed and discussed.   Tables 6.

USSR   UDC   658.3:658.532:621.65.011.56

AUTOMATED SYSTEM OF PERSONNEL ACCOUNTING

Moscow MEKHANIZATSIYA I AVTOMATIZATSIYA PROIZVODSTVO in Russian No 5, 78
pp 55-56

PASTUKHOV, G. M., candidate in economic sciences, and LOBANOVA, N. M.,
engineer

[Abstract] An automated system for personnel accounting (ASUK) is described,
which supplies the administration of any plant or enterprise with operation-
al and reliable information concerning industrial-qualification, social,
business-like and personal characteristics of workers and is used to obtain
current information with respect to personnel. This system, the basis of
which is a master date file (GM), is divided into entries each of which char-
acterizes a specific item containing a collection of criteria presented in
a formalized way. The purpose of an ASUK is search and delivery to a user
on a basis of specified parameters of interesting data concerning an entity.
It is an autonomous part of an automated system of plant management and in-
cludes information, equipment-program and organization provisions. It is
possible that an ASUK can be used independently of an automated enterprise
management system (ASUP). At the same time, an ASUK has branch connections
with other subsystems which supply their information concerning personnel.
A block diagram is shown of the functioning of a hardware complex of an
ASUK, as well as the scheme of the technological process for handling re-
quests. Figures 2; tables 2.

USSR

CHERNOVITSKAYA OBLAST COMPUTER CENTER RELOCATED

Kiev PRAVDA UKRAINY in Russian 18 Jun 78 p 2

[Text] Ratau--The Computer Center of the Statistical Administration of
Chernovitskaya Oblast has been relocated in a new building.

Shown in the photograph: Senior Engineer Mathematician-Programmer G. A.
Tsimbarovich (left) and Engineer Mathematician-Programmer T. V. Slastenova.

В новом здании разместился вычислительный центр статистического управления Черновицкой области. На снимке за работой...

USSR

NEWS OF THE CENTRAL STATISTICAL ADMINISTRATION USSR

Moscow IZVESTIYA in Russian ["Objectively, Precisely, Laconically"] 27 Jul 78 p 3

VODOLAZHSKIY, V.

[Abstract] There are currently 78,300 graduate [diplomirovannyye] specialists working in state statistics organizations. There are 2,952 computer organizations in operation within the system of the USSR Central Statistical Administration [TsSU SSSR]; of these, 171 are computer centers at the union, republic, and oblast levels. All of these centers are equipped with modern computer technology, which served as the basis for the implementation of the first state of the ASGS [automated system of state statistics]. Creation of the second stage is now underway.

According to M. Korolev, first deputy chief of the TsSU SSSR, one of the most important tasks which state statistics organs will be undertaking in the near future is the All-Union Census, which will be conducted in January 1979.

The photograph shows T. Chekulayeva and L. Kuz'mina, engineers, in the Computer Exploitation Department of the Main Computer Center, TsSU SSSR, processing statistical data.
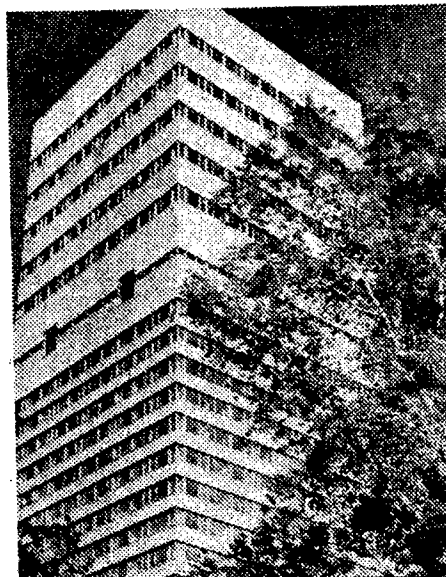

USSR

TsSU COMPUTER CENTER WILL PROCESS CENSUS RESULTS

Kiev PRAVDA UKRAINY in Russian ["An Important Affair"] 18 Aug 78 p 4

[Abstract] The All-Union Census of the Population will be carried out 17-24 January 1979 by the Central Statistical Administration USSR [TsSU SSSR].

In the photographs: exterior view of the TsSU SSSR; in the machine room of the TsSU SSSR Computer Center, electrical engineer V. G. Zolotov is preparing disk storage units for use.

63

J. Financial System

ROMANOV, A. A., candidate in technical sciences, GUZHEV, B. P. and PANFILOV,
A. B.

[Abstract] The "ASU-Stroybank" [automated management system--Stroybank (All-
Union Bank for Financing Capital Investments)] required heavy one-time ex-
penditures in system design, equipping of premises and purchasing equipment.
Economic benefits must accrue from the performance of this ASU in order to
justify its construction and operating costs. But benefits can be calculated,
from published material, thus far only for ASU in sectors making material
values. Now, savings from ASU use in the Stroybank are twofold: direct and
indirect. Direct savings flow from lower labor outlays in processing Stroy-
bank establishment information by computer; indirect savings come from smooth-
er, overall running of the Stroybank establishments because of computer ap-
plications. Concepts from the theory of production functions are invoked
in determining the dependence of the indirect savings on quantities which
characterize changes in the cumulative indicators of the performance of
Stroybank establishments that occur because computers process establishment
information. A production function is defined as a mathematical-economic
expression of the dependence of the outcome of production activity on the
technical-economic factors responsible for this activity. A hierarchy of
subsidiary technical-economic factors is structured in order to embrace the
spectrum of dependent factors underlying the result of production activity.
As an illustration, turnover time for document-handling in 1976 was reduced
by 4.1 days at the Moscow city office of USSR Gosbank for Glavmosstroy [Main
Administration for Housing and Civil Engineering in Moscow City]. References
7 (Russian).

USSR

PROBLEM OF AUTOMATIZATION OF ANALYTICAL PROCESSING OF INFORMATION

DROZDOVA, VALENTINA VLADIMIROVNA, candidate in economical sciences, dotsent
Moscow Finance Institute; and SERGEYEVA, GALLINA VLADIMIR OVNA, candidate
in technical sciences, acting dotsent Moscow Finance Institute

[Abstract] Automated management systems (ASU) play an important role in the
creation of an efficiently operating mechanism for management of the national
economy. At present an adequate test of the functioning of ASU exists, an
analysis of which makes it possible to find a means to solve the problem of
assuring further development and increase of efficiency of ASU and computing
centers (VTs), uniting them in succession into a unified state-wide system
for collection and processing of information (OGAS) for accounting, planning
and management. In order successfully to create an OGAS it is necessary to
identify and to use the already available favorable experience of operation
in the field of individual ASU. The staff of the scientific departments for
analysis of economic activities, Moscow Finance Institute, is concerned with
development of the principles of analytical work at all levels of management
of industry and construction as a base for creation of a unified system of
economic analysis, regulated on a national scale. With this goal in mind,
a study was made of practical experience in the organization of analytical
processing of information at the VTs of 50 large-scale enterprises, 28 VTs
of associations, and 4 sector automated management systems (OASU), as well
as construction automated management systems (ASUS) at all levels of con-
struction management. The investigations conducted showed that mechaniza-
tion and automation of accounting and planning at industrial enterprises,
in construction trusts and ministries contributed to the build-up of informa-
tion concerning the practical results of economic activity and made it possi-
ble in many ways to classify and process statistical, technical-industrial
accounting and bookkeeping data. However, as a rule, typical projects for
mechanization of individual portions of planning and accounting developed
and introduced by departmental scientific-research institutes, and in a num-
ber of cases by VGPTI TsU SSSR (All-Union State Planning and Technological
Institute, Central Statistical Administration, USSR), did not assure that
data of an analytical nature would be obtained. Meanwhile, information by
itself provided by various forms of national economy accounting still does
not represent material for making decisions. Selection of an optimum solu-
tion is possible only on the basis of a thorough complex analysis of the
state of the subject which is managed. Because of certain deficiencies
pointed out in the paper, it is impossible to use in an analysis the output
documents produced by projects for mechanization of accounting work without
labor-intensive additional coordination and processing. For realization of
a systematic complex approach to the study of an object, interconnected pro-
cessing is necessary for the data of all forms of national economy accounting,
i.e., an integrated system for collection and processing of economic informa-
tion data (ISOD). Creation of an ISOD in each ASU is one of the directions

for further perfection of ASU. At present there are both subsystems which put into practice of the functions of management, and subsystems in which all the functions of management are accomplished. Subsystems of bookkeeping and technical-economic planning serve as examples of the first type. Management of supplies of materials and machinery, basic and ancillary production, and sales pertain to the second type. According to the VTs studied by the authors, the overall number of functional subsystems in an ASU reaches 27. Tables are presented which lists those which occur most often. The manner in which organization of analytical work under the conditions of operation of an ASU is accomplished are discussed. Tables 2.

K. Agriculture, Water Management, Land Reclamation, Sylviculture

USSR

PRODUCTIVITY OF FORESTS INCREASED BY COMPUTERS

GALICHAYA, N.

[Abstract] Activities of the Cybernetics Laboratory of the Department of Forestry, Moscow Agricultural Academy imeni K. A. Timiryazev (TSKh) are described by Doctor of Biological Sciences, Professor Boris Vladimirovich Dobrovol'skiy. The laboratory, which was established almost 15 years ago, uses electronic computer (EVM) technology to control processes taking place in nature, in order more efficiently to use its resources. Long-term forecasts of natural calamities is in the list of top-priority problems. Obtaining timely information concerning a future flood or drought, high or low harvests, is a guarantee of an efficient struggle with their after effects for the national economy. With the aid of a method developed by Corresponding Member of the All-Union Order of Lenin Academy of Agricultural Sciences imeni V. I. Lenin (VASKhNIL), Dr of Agricultural Sciences, Professor V. G. Nesterov, it is possible precisely to make such a forecast. Not the weather as many imagine but a natural situation at a specific moment which brings about a particular result. An original device, a bioecocompass, is used by Dr Dobrovol'skiy. "As is known," he said, "gravitational forces cause specific distortions of the earth's natural environment. And here it is important to determine the arrangement of the planets with reference to one another and the sun. Because of the different speeds of movement, their disposition and the direction of gravitational forces are constantly changing. To a particular degree all this affects the origin of specific natural situations on our planet. The disposition of heavenly bodies produces a unique bioecocompass. Naturally, its data are approximate and the basic data are obtained by mathematical methods and are figured out on an EVM." The "code" of ordinary slices of tree trunks with annual rings is interpreted on special devices and the sequence of favorable and unfavorable periods is determined. In order to test the precision of methods applicable in a laboratory, "forecasts were made for a hundred years ago. The results were compared with data from the archives. Their almost complete coincidence was confirmed. Work at Dr Dobrovol'skiy's laboratory concerned with development of the so-called programmed forests of the future is described. The productivity of a forest grown under optimum conditions and calculated on an EVM is increased many times. As the result of a whole complex of investigations, original "models" were established of a green mass which takes this or that form as a function of the objective set by man--a forest created for recreation or for industry.

USSR/GDR   UDC 631.354.2

PLANNING OF COMBINE HARVESTING BY COMPUTER

SHUBERT, E., graduate agronomist, grain economy combine, Dresden; LIPEL'T,
A., graduate agronomist; and LIPEL'T, R., graduate agronomist, Robotron
State Enterprise, Dresden, GDR

[Abstract] The SIMKA system of models and programs has been developed in
order to plan the operation of combines harvesting grain, in order to mini-
mize the losses of grain by allowing each crop to be harvested at the optimal
time. The SIMKA system includes a module for correlation and regression an-
alysis, the TERM program to model the time when the grain will be ready for
harvest, the REGEN program to model weather conditions and the ABLAUF pro-
gram to model the process of operation and maintenance of equipment. The
use of the SIMKA system to plan the grain harvest in a district is described.
The interchangeability of standard model and program system elements of
SIMKA allows it to be applied broadly in situations where operating limita-
tions, external factors such as weather conditions and equipment reliability
factors must be considered in a time-restricted environment. Figures 1;
tables 3; references 2 (German).

USSR   UDC 681.3/631

AN AUTOMATED (ELECTRONIC COMPUTER-BASED) SYSTEM FOR AGROCHEMICAL STUDIES

SRAPENYANTS, R., candidate in technical sciences, KARTSEV, YU., candidate in
agricultural sciences, LISTOVA, M., candidate in biological sciences,
MKRTCHYAN, M., senior scientific worker and ARUTYUNOVA, L., senior engineer.
All-Union Scientific Research Institute for Fertilizers and Soil Science
imeni D. N. Pryanishnikov, USSR

[Abstract] Automation is one of the main tools of scientific and technical
progress. Interesting studies on the application of automation to agricul-
ture are being conducted by the authors' institute. They include the crea-
tion and practical application of automated information retrieval systems in
combination with rapid methods of massive analysis of soils and plants. The
institute has created, tested and introduced an automatic installation for
multiple-element neutron-activation analysis of plants and soils. It can

analyze 250-500 specimens for their content of nitrogen, phosphorous, potassium, calcium, magnesium and other elements in eight hours, determining up to seven elements at once. The institute is now perfecting an automatic radiometric express method for determination of the composition of soils and plants, based on the excitation of atoms with ionizing radiation and recording of secondary X-ray fluorescence. This method can determine the content of manganese, copper, zinc, cobalt and other trace elements, as well as certain elements present in larger quantities phosphorous, potassium and calcium. Another automatic analyzer rapidly determines the amino acid composition of plant proteins. A description of an automated system for agrochemical studies is presented, including a block diagram of the interaction of the hardware and a flow chart of the operation of the software. This information retrieval system, with constantly supplemented information in the data bank of the computer, can perform a broad range of tasks related to the operation of farms and agricultural research. Figures 2; tables 1; references 7: 6 Russian, 1 Western.

USSR

AUTOMATED MANAGEMENT SYSTEM INSTALLED AT EXPERIMENTAL FARM

Moscow OGONEK in Russian (Photo Caption) No 28, Jul 78 p 17

[Text] The "Zootekhniya" Automated Management System, which has been put into operation at the Experimental-Industrial Farm imeni B. N. Sidorenko of Tomsk State Agricultural Experimental Station, is a symbol of the unity of science and industry.
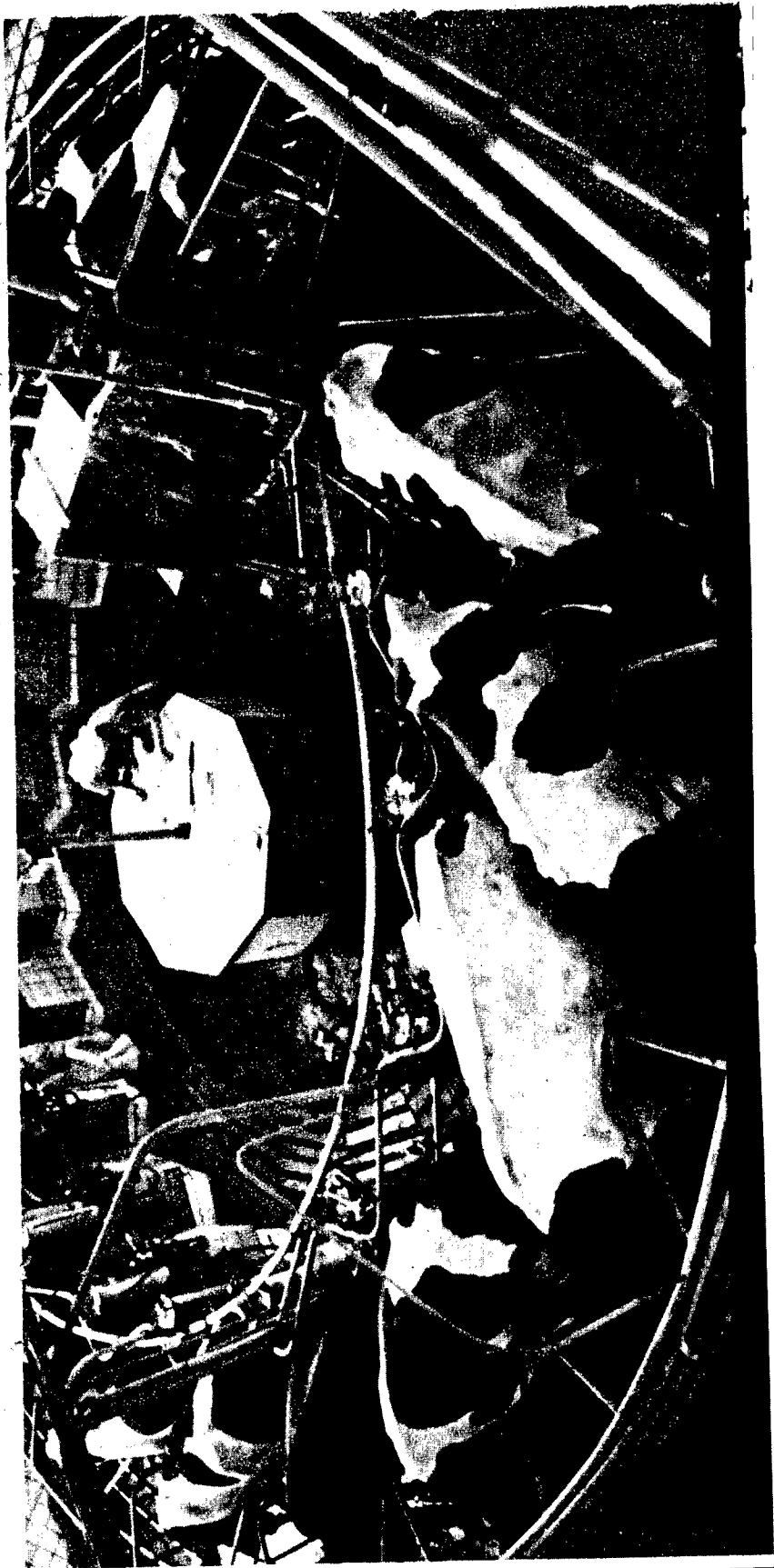
USSR

COMPUTER-DESIGNED TIMBER

Moscow MOSKOVSKAYA PRAVDA in Russian 13 Aug 78 p 3

[Text] A new method for planning timber tracts has been developed by the
Moscow Agricultural Academy imeni K. A. Timiryazev.

Scientists of the Laboratory of Cybernetics of Living Nature decided to ap-
ply contemporary computer technology to this task. Computers accurately and
quickly calculate temperature conditions, moisture, and other indicators
characteristic of the soils of a given region. Corresponding recommendations
are obtained for the use of one or another species of trees, for the position-
ing of "green tracts," for the care of seedlings and older plantings. The
computer takes into account climatic peculiarities of the area, the frequency
of dry spells, rain fall, and wind patterns. This makes it possible to sig-
nificantly cut timber losses and to shift many timber operations to industri-
al harvesting methods. The system developed by the Moscow scientists is
expected to be applied in the near future in planning sections of the "green
ring" around Moscow.

USSR

EFFECT OF RESERVOIR ON GROUND WATER CALCULATED BY COMPUTER

Moscow IZVESTIYA in Russian ["The Computer Predicts"] 24 Aug 78 p 3

GANZHA, V.

[Text] Alma-Ata. What sort of effect will the future Kapnapayskoye Reser-
voir have on the level of underground water in neighboring oblasts? The an-
swer to this question was given by a computer, using a mathematical program
developed by hydrogeological scientists at the Academy of Sciences Kazakh
SSR. The answer stated that the man-made sea will raise the level of ground
water by a projected volume of 28 billion cubic meters in a 30-kilometer
band.

The procedure supplied by the Alma-Ata scientists ensures that analogous fore-
casts which take into account the interests of ecology can be made for the
zones of all the large water reservoirs being created in various regions of
the country.

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L. Other

[Text] A new medical center has been set up in Riga--the Scientific-Research Institute of Cardiology of the Latvian SSR Ministry of Health, which is headed by Dr of Medical Sciences, Professor Nikolay Andreyevich Andreyev. The following are taken from a wide spectrum of problems, on the solution of which the collectives of this Institute will work:

a. Study of the rate of occurrence of illnesses of the cardio-vascular system and their detection during mass preventive inspections;

b. Participation in the development and test of equipment complexes and systems with the use of computing methods for diagnostics of cardio-vascular illness under conditions of a polyclinic and a hospital;

c. Checking of new native heart patient preparations in collaboration with scientists of the Institute of Organic Synthesis of the Latvia SSR Academy of Sciences.

Professor N. A. Andreyev emphasized that preventive cardiology, prevention of cardio-vascular illness in those who are healthy, but have factors of risk, preventive treatment of complications with the sick, preventive treatment of relapses carrying an infarct, and ichemic disease of the heart are the principal problems of the new scientific medical center of Soviet Latvia.
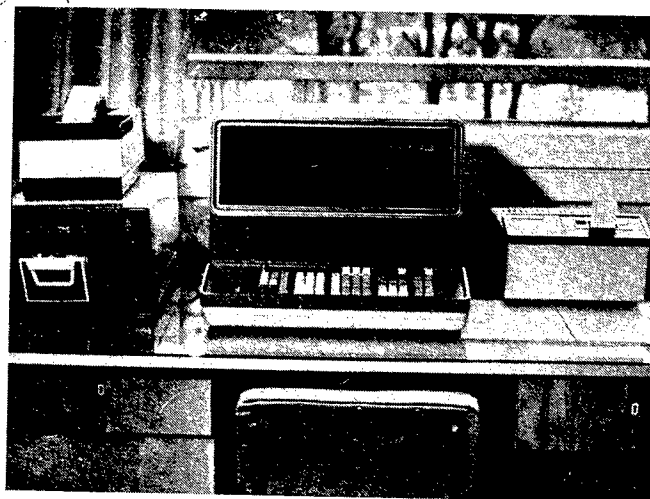
Autointerviewer (mini-computer "Iskra-125") intended for a massive preventive treatment survey of cardio-vascular illness.
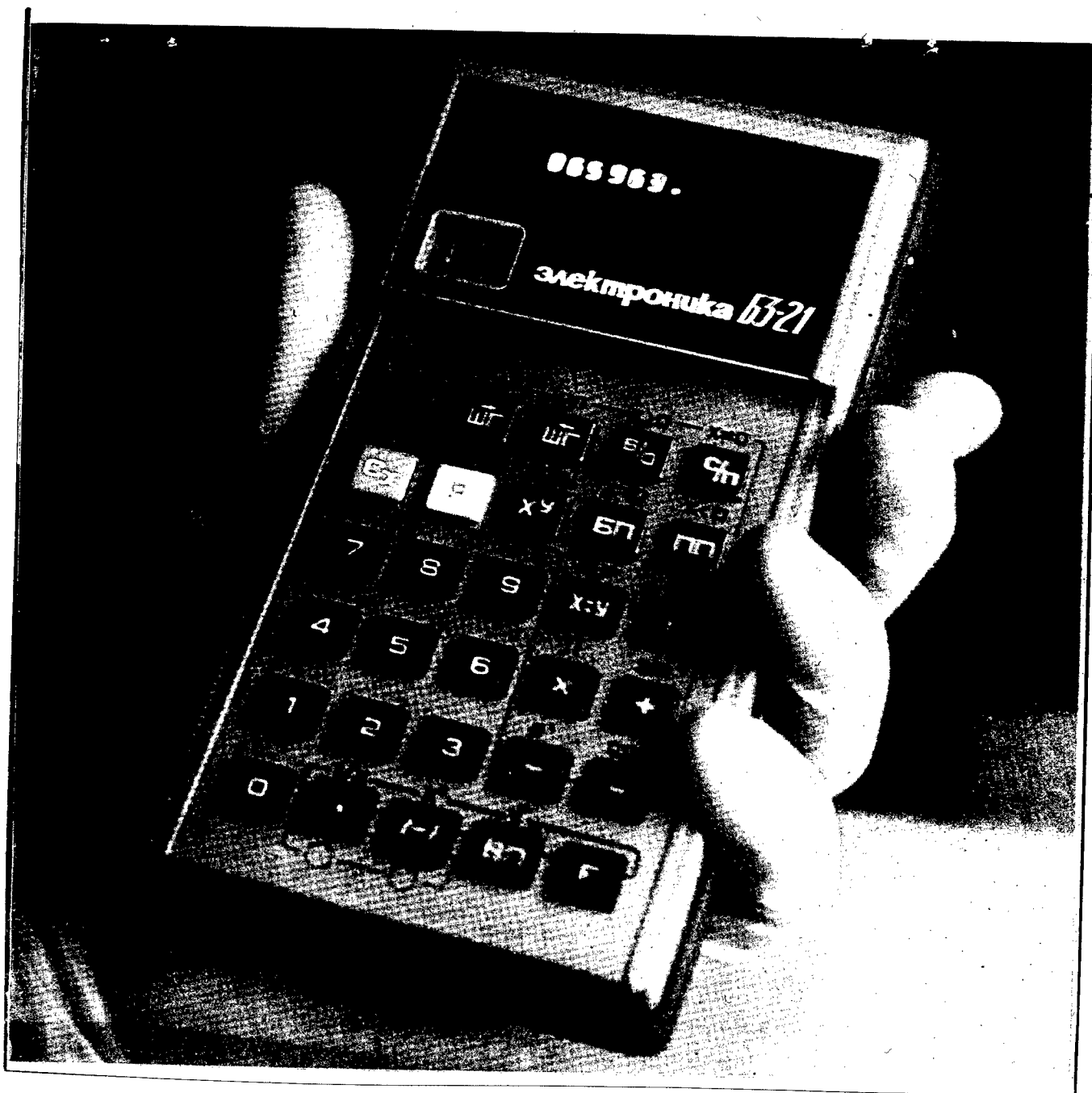
With the aid of the "Elektronika BZ-21 device, not only is diagnostics of cardio-vascular illness carried out, but also forecast of their course. (Photo by V. Zhivtse)

USSR

USE OF COMPUTERS IN MUSEUMS: INTERACTION BETWEEN PROFESSIONS

RYABOV, A., dr in technical sciences, Director Scientific-Research Center, Ministry of Culture, USSR

[Abstract] Fifteen years ago a graduating student of Moscow University who had selected the specialty of psychology for himself would have been extremely surprised if he had been told that he must take an examination in mathematics. Today this requirement is already accepted as natural. And what is more, even at such an ancient humanitarian VUZ as the Moscow Historical and Archives Institute, young people become used to the thought: at facilities where the foundations of contemporary business correspondence and scientific-technical information are studied, knowledge of precise branches of sciences has not been omitted. Intensification of specialization, characteristic of today for all spheres of work, is perhaps not excluded, but on the other hand it requires expansion of relations between representatives of various professions. And this in turn logically leads to another problem--harmonic development for both humanitarian and technical specialists. Recently, for example, the Scientific-Research Center of the Ministry of Culture, USSR, demonstrated a model of a system of centralized accounting of memorials of history and culture. Making use of a rather simple "key," architects, restorers and other specialists who studied the heritage of native creativity, painting and national creative power, were able to obtain the necessary data. Moreover, not in the form of dry coded records. The manner in which computers and management systems can be used in museums is discussed.

AN INFORMATION-REFERENCE SYSTEM FOR THE SOCIAL ORGANIZATIONS OF AN ENTER-
PRISE

KHUSAINOV, A. A. and ALEKHIN, YE. V., engineers

[Abstract] The Electrovypryamitel' [Electrical Rectifier] Plant in Saransk
has worked for more than 5 years on the problem of increasing the degree of
cooperation between plant social organizations (the unions, komsomol, scien-
tific and technical society, and engineering society), which are involved
in certain administrative functions (socialist competition, the movement
for a communist attitude toward labor, collective bargaining, workers' meet-
ings, various contests) and plant management. This experience and others
have indicated the need, during development of plant automated management
systems (AMS), to consider the information needs of social organizations of
enterprises and include an information-retrieval system for their use in the
computerized plant AMS. The AMS can assist these social organizations with
such tasks as calculation of the savings of labor and material resources
achieved by individual creative plans, calculation of the results of social-
ist competition, analysis of the conditions of labor and safety situation,
checking of labor discipline and social order, and checking for the fulfill-
ment of decisions and resolutions adopted by social organizations. Figures
1; tables 1; references 2 (Russian).

B. Urban Systems and Communal Services

USSR

COMPUTERIZED MATCH-MAKING

Riga NAUKA I TEKHNIKA in Russian ["Is an 'Electronic Match-Maker' Necessary?"]
No 3(212), Mar 1978 pp 26-27

MELIKSETYAN, ALEKSANDR, candidate in pedagogical sciences

[Abstract] The author states that millions of single men and women suffer from
loneliness   and are anxious to create a healthy sturdy family, but for one
reason or another are not in a condition to do this. From the point of view
of society, for the sake of social welfare, it is necessary to help these
people. To take the view that the problem does not exist--this is a naive
and unreasonable position. Solution of the problem separates into two parts:
program "minimum" which is needed to solve the problem of acquainting single
people; and program "maximum"--forecasting of marriage (determination of
psychological compatibility of future husbands and wives). In both cases an
electronic computer must be used as a helper. In Hungary at the end of the
60's, the Association for General Information (Ob'yedineniye vseobshchey
information) "Tempo," organized at Budapest an Institute of Marriage Media-
tion (Institut brachnogo posrednichestva) in the form of the "Four Seasons"
Bureau. Management of the Association engaged psychologists of the Institute
of Sociology, Hungarian Academy of Sciences, and specialists in computing
technology, and instructed them to solve the problem of a search for matri-
monial couples with the aid of an electronic computer. The paper describes
how the Bureau operates and the type of client. A similar organization in
Prague is called "Shiznamka" and in Warsaw, "Siren."

C. Education

USSR

ELECTRONIC COMPUTERS--HUMANITARIANS

Moscow VESTNIK BYSSHEY SHKOLY in Russian No 5, May 1978 pp 27-31

ANDRYUSHCHENKO, V. M., dotsent, Moscow State University imeni M. V. Lomonosov

[Abstract] The paper discusses the basic party and philosophic evaluation of the role of humanitarian sciences, and particularly their applied directions in contemporary society. Here in all seriousness problems are rised regarding mathematizing humanitarian knowledge, the use of mathematical methods of analysis in social sciences, conversion of such methods into "an important instrument of sociological, economic and psychological investigations" and "the use of electronic computer and information technics, not only in production and in the sphere of service, but also in the study of public opinion, and the organization of ideological and party work." [Quotes are from KOMMUNIST, No 1, 1977.] Directions are described in which large-scale results have been obtained and standard methods worked out for the fields of philosophy, historical science, psychology, juridical sciences, journalism, philology, and applied linguistics. The use of mathematical methods and computing techniques is discussed. Wide use in studies, of the hardware and software of YeS electronic computers is considered important, and it would be advisable to organize contemporary computing classes for this goal.

COMPUTER SYSTEMS AND NETWORKS FOR AUTOMATION OF SCIENTIFIC INVESTIGATIONS

YAKUBAYTIS, E. A.

[Abstract] The architecture of computer systems and networks constructed
for automation of scientific investigations is analyzed. In connection
with multimachine complexes, the paper discusses the computer systems of the
Los Alamos Scientific Laboratory, the University College in London, the
Lawrence Livemore Laboratory (University of California), the Hahn-Meitner
Institut fuer Kernforschung (West Berlin) and the Virginia Polytechnical
Institute and University. A discussion of the logical structure of comput-
ing systems, including the basic groups of functions, is concerned with the
logical structure of communication systems, the logical channel between pro-
cesses, and the hierarchy of transactions of computer systems and networks.
The physical structure of computer systems, communication systems and com-
puter networks is also discussed. Particular attention is given to the ex-
perimental computer system of the LatSSR Academy of Sciences. A dictionary
of terms and abbreviations used in the paper is presented. Figures 17;
tables 1; references 7: 1 Russian, 6 Western.

CONCERNING CERTAIN ASPECTS OF AUTOMATIZATION OF LINGUISTIC RESEARCH

YAKUBAYTIS, T. A., SKLYAREVICH, A. N. and BAKHAREV, M. T.

[Abstract] Work on the creation of statistical models of glossaries and
grammar for Latvian speech is conducted with the assistance of an electronic
computer (EVM) of the "Minsk" family at the Laboratory of Mathematical Lin-
guistics, Institute of Language and Literature and at the Institute of Elec-
tronics and Computing Technology of the LatSSR Academy of Sciences. As a
result the four-volume publication "Frequency Dictionary of Latvian Language"
and investigations with respect to grammatical structure appeared. Use of
the "Minsk 23" and "Minsk 32" EVM for these goals was associated with sig-
nificant difficulties. Consequently, during an evaluation of the effective-
ness of using an EVM in investigations of linguistics it is advisable to
proceed from the present day possibilities of computing technology. It is

particularly important to note the use of terminal complexes, provided with displays which make it possible substantially to improve the method for input of a file, search and correction of errors, as well as editing of the output file. The possibility of interaction in a dialogue regime fundamentally changes the nature of the work of a linguist with a machine. A significant increase of the memory and the speed of response of a third generation machine, and the creation of computing systems and networks makes it possible to increase automation of linguistic investigations to a qualitatively new level. At present EVM of the third generation system of YeS as well as the minimachine NOVA and WANG are used in the Laboratory of Mathematical Linguistics. The present short communication is concerned with determining the nature of the dependence of the statistical parameters of the parts of speech on the length of the coherent (comprehended) text. The real dependences of the mathematical expectations, dispersion, mean square deviation and relative mean square deviation on the length of a text are revealed, substantially differing from corresponding assumptions concerning the independence of a sequence of parts of speech in real text. The possibilities for a simple approximate presentation of these dependences are well founded. Figures 4; tables 1; references 4 (Latvian).

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MAIN TRENDS IN THE DEVELOPMENT OF AUTOMATIZATION OF SCIENTIFIC INVESTIGATIONS IN NUCLEAR PHYSICS

OFENGENDEN, RAFAIL GRIGOR'YEVICH, dr in technical sciences, IYaI AN USSR [Institute of Nuclear Research, UkrSSR Academy of Sciences] (Kiev)

[Abstract] Several reports are included in the above journal which were initially presented at the 1st All-Union Conference on Automatization of Scientific Investigations in Nuclear Physics (Kiev, Oct 1976). Summaries of all the reports were published in a book by the same title, Kiev, Institute of Nuclear Research, UkrSSR Academy of Sciences, 1976, 288 pp. The present paper discusses the following in detail: analog processing of information, filtration of signals, amplitude-code converters, time converters and digital data processing (modular system of CAMAC; method of construction of devices for measurement of multidimensional distribution in real time; architecture of systems of data processing in real time). The discussion considers the principles of measurement of distributions in the range of a million channels. Figures 4; references 50: 19 Russian, 31 Western.

A CIRCULAR SYSTEM WITH SEQUENTIAL TRANSMISSION OF COMMON BUS SIGNALS

MYACHEV, ANATOLIY ANATOL'YEVICH, engineer (Moscow)

[Abstract] In recent years use of electronic computers with a common bus in systems of automatization of scientific investigation and an industry has increased. In the present paper, a new universal system is suggested for the connection of computers with a common bus with remote subsystems, namely a cyclic system with sequential, unidirectional transmission of common bus signals. This system places practically no limit on either the types of subsystems and peripheral devices connected or their software. One advantage of this system is its effective utilization of data reduction by the simplex method of operation of the transmission line. Another advantage is the capability of establishing priorities of subsystems. Furthermore, in typical distributed control systems, the use of the cyclic structure yields a gain in the length of transmission lines. The organization of a sequential circular system is described, as well as types and structures of messages transmitted. Methods of message synchronization and the effective information throughput are discussed. The main task for the immediate future is determination of the best methods of design of system structures, considering the achievements of microcircuit technology and LSI. The next stage in development of a circular system is development of a structure using a separate line for transmission of requests, and also using multichannel concentrators as sequential control devices connected to the common bus of the central computer by one line and to the remote objects by several lines. Figures 1; tables 1; references 4 (Russian).
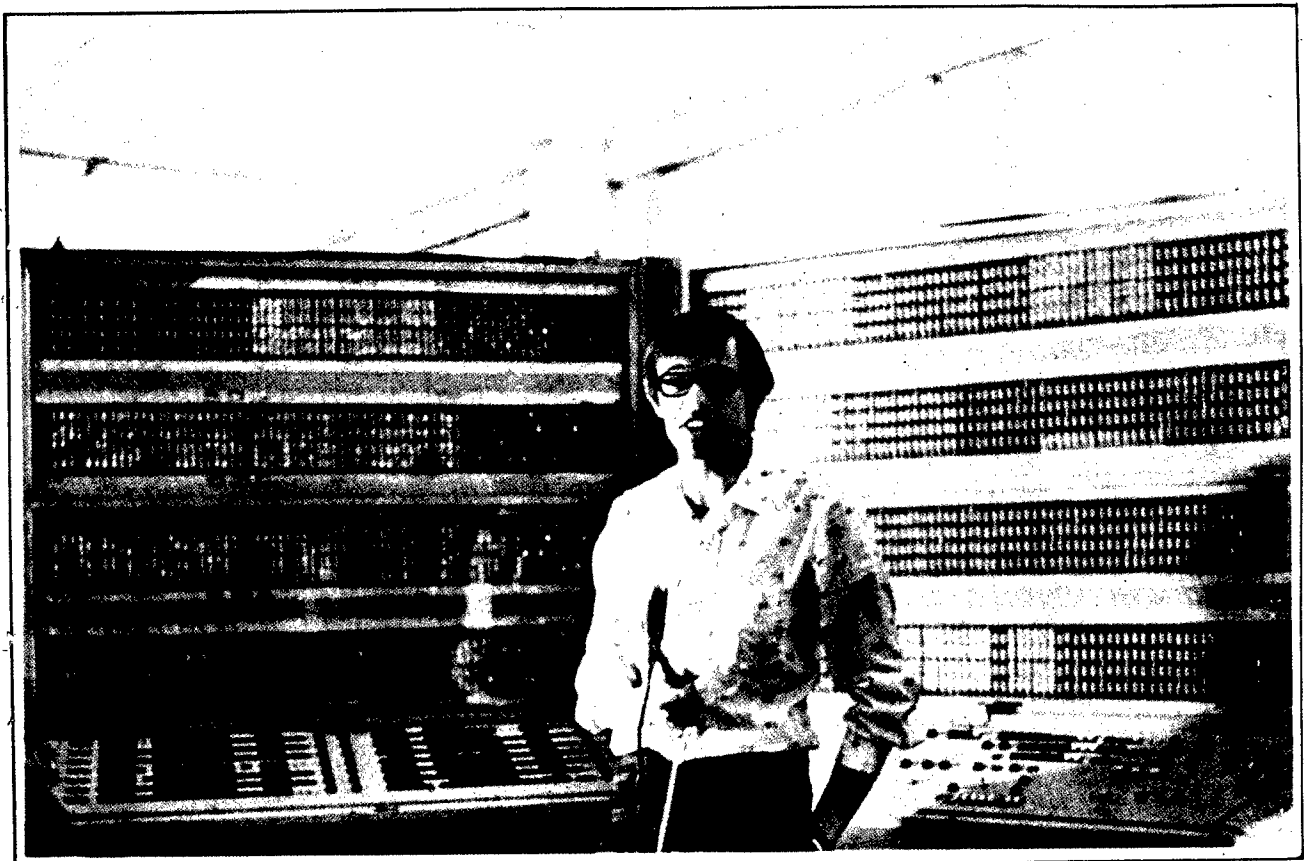
USSR

SPEECH RECOGNITION SYSTEM CREATED AT UKRAINIAN INSTITUTE OF CYBERNETICS

Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 3, May/Jun 78, photo
on inside front cover, caption on p 143

[Text] An experimental speech recognition system based on the BESM-6 com-
puter is being demonstrated in the photo. The system, which was created by
the Institute of Cybernetics, Ukrainian SSR Academy of Sciences is capable
of recognizing both individually pronounced words and connected speech con-
sisting of words from a selected lexicon. The lexicon contains 500 words
at the present time, and the reliability of recognition is 98 percent. The
system can be instructed (tuned to) the lexicon and to the voice of the user.

F. Artificial Intelligence

USSR

SHOP TO PRODUCE METAL-WORKING ROBOTS

Tashkent PRAVDA VOSTOKA in Russian ["A Shop For Robots"] 11 Aug 78 p 1

[Text] A shop which will supply national enterprises with industrial robots for automating forge and press production, metal processing and molding is under construction at the experimental production facility of the Kramatorsk Scientific-Research and Planning-Design Institute of Machine Building. Forty of these units per year will be made here.

Manipulators with programmed control will transfer and position billets in presses and machine tools, pack products and assume other laborious operations. Each automat will replace no fewer than two to three workers and will increase labor productivity by several times.

The location for the new production facility in the Donets Coal Basin was not chosen by chance. In manufacturing the robots, the institute will be able to assist producers with the rapid implementation of the new technology and with the development of technological processes and plans for automated sectors and production lines. The first robots will be manufactured by December. Series production of them will begin before the end of the 5-Year Plan.

USSR

EXPERIMENTAL WELDING ROBOT BEING TESTED IN GOR'KIY PLANT

Kiev PRAVDA UKRAINY in Russian ["Robots—Electric Welders"] 18 Aug 78 p 4

DEMCHENKO, TAMARA, "Novosti Press Agency" Correspondent

[Abstract] Vladimir Lebedev, deputy director of the Institute of Electric Welding imeni Ye. O. Paton, Ukrainian SSR Academy of Sciences discusses an experimental model of a robot which his institute developed and which is now being tested at the Gor'kiy Motor Vehicle Plant. The robot moves and aligns the welding tongs for spot welding during the production of motor vehicle body parts and drivers' cabins. Parts welded by the robot are more durable and of a quality superior to that of hand-welded parts.

The institute is also developing an experimental model of a robot to automate the complex process of arc welding. It is estimated that this robot will be ready for production about 1980.

IV. INFORMATION SCIENCE

A. Information Services

ALLOCATION OF DATA BANKS FOR INDIVIDUAL USE AND OF COMPUTATIONAL WORK OF
SUBSCRIBERS OF COLLECTIVE USE COMPUTER CENTERS

SHASTOVA, GALINA ALEKSEYEVNA, dr in technical sciences, VNIIPOU [expansion
unknown] (Moscow); and GRIZODUBOVA, OL'GA NIKOLAYEVNA, senior scientific
worker, VNIIPOU (Moscow)

[Abstract] During planning of a VTsKP [collective use computer center], the
problem of allocation of data banks for individual use and computational work
of subscribers arises in connection with the fact that in a number of cases
subscribers of a VTsKP become enterprises which already have in-house elec-
tronic computers and even a computer center. The present work considers
data banks for individual use of a subscriber, i.e., those which are used
only for solution of problems of this subscriber and for regular computing
operations for which the periodicity, composition and volume of the data in
process are known. The problem of allocation of groups of data banks for
individual use and for computing operations is formulated, and a mathemati-
cal model is proposed for solution of this problem. References 6: 5 Russian,
1 Western.

OPTIMIZATION OF THE STRUCTURES OF EXPERIMENTAL DATA COLLECTION SYSTEMS

VITTIKH, V. A., KUKLIN, G. N., TOMNIKOV, G. N. and TSYBATOV, V. A.

[Abstract] The problem of topological optimization of experimental data
collection systems is discussed. Using as an example an airborne system for
collection of measuring data (BSSI) and the most typical composition of its
elements, an optimization algorithm is considered which makes it possible to
determine the structure of the system and the coordinates of its elements ac-
cording to the criterion of a minimum of complexity of a data transfer net-
work. Figures 5; references 5 (Russian).

ESTIMATE OF THE LOSS OF PRODUCTIVITY CAUSED BY EXCHANGE OF DATA IN MULTI-
MACHINE CONTROL COMPLEXES OPERATING IN REAL TIME

SHTRIK, ALEKSANDR ARKAD'YEVICH, candidate in technical sciences (Moscow)

[Abstract] The costs related to inter-machine exchange of data formed and
stored in the main memory of the machines during running of functional pro-
grams performing various tasks related to a single control algorithm are
determined. It is characteristic that in multi-machine complexes, the dif-
ferent machines do not have direct access to common data or results. This
requires preliminary rewriting of common data prepared by one machine in
the main memory of another machine, which is to run a program utilizing the
data. Factors reducing the productivity of multi-machine systems during
data exchange are analyzed. A time diagram of the operation of one machine
in a multi-machine system is presented. It is found that the relative losses
in productivity caused by conflicts in data-transfer memory are proportional
to the square of the total relative losses caused by rewriting of data in one
machine. It is recommended that accessing of data-transfer memory by the
job program be given absolute priority. The maximum value of productivity
of a multi-machine system is one-third the sum of the productivities of all
its component machines if the relative time spent in transmission of data is
equal to half of the machine operating time. Figures 5; references 8: 6
Russian, 2 Western.

THE ORGANIZATION OF FORMATED INPUT-OUTPUT IN DATA PROCESSING SYSTEMS

VOZNYUK, MIKHAIL VIKTOROVICH, engineer, PO "Elektronmash" [? Planning Depart-
ment, "Electrical Machines"] (Kiev); and KHOTINOK-KHOTENKO, VERA ISAAKOBHA,
engineer, PO "Elektronmash" (Kiev)

[Abstract] The standard software for the M6000 computer provides the user
with a special input-output formatting program called FORMATTER. However,
this program has a number of shortcomings, the most important of which is
the fact that FORMATTER returns control to the program which called it, only
after completing the printing of a row, so that it is impossible to combine
printing with the formation of the next row. The program was therefore re-
vised, producing a system of programs with all of the capabilities of FOR-
MATTER, plus the ability to work with fixed-point numbers after the sign

digit, i.e., fractional numbers, as well as numbers of dual length. The
entire system consists of two parts: the individual conversion programs
and the row-by-row output program. The format-conversion programs are listed
and briefly described. Experimental operation has shown that these programs
are more convenient to use than the old FORMATTER, their speed is higher and
accuracy is greater. Further improvement of the program is planned, with
buffering of the requests in free memory for operation with the punchtape
operating system of the M6000 computer. Tables 2.

ZHOKIN, YU. N., Moscow

[Abstract] Choice of the topology of a network which assures minimum cost
of the creation and operation of communication lines is a necessary stage
of creation of the majority of teleprocessing networks. Algorithms of two
types are used for finding the topology of networks of minimum cost: 1)
"Optimum," which has the principal shortcoming that a long time is required
for solution of the problem; and the "heuristic," which gives a solution
close to optimum. The present work proposes a heuristic algorithm which
uses the rule of least increment (PNP) for determining the order of connec-
tion of the terminals. For 800 variations of random arrangements of the
terminal, the quality of solutions by the algorithm with the use of PNP
proved on the average to be better by 6 percent than an algorithm proposed
in the literature. Figures 2; references 2 (Western).

PRINCIPLES OF VIRTUAL NETWORKS FOR SENDING MESSAGES

KIRILLOV, D. A. and MIKHEYEV, M. G., Moscow

[Abstract] Problems of organization of virtual networks for sending messages
are considered and brief comments are made concerning the languages for de-
scription of virtual networks and interaction with them, realization of which
assures integrated servicing for users of various classes and helps to solve--
at any rate partially--the program compatability of networks. Complicated
program complexes for control of the resources of electronic computers en-
tering the network can be created on a base of the virtual network. Such
program complexes will assure planning, loading and control of computing
powers, program systems, batches of applied programs and data bases. Fig-
ures 1; references 10: 2 Russian, 8 Western.

V. THEORETICAL FOUNDATIONS

A. Game Theory and Operations Research

SIMULATION GAMING AS A METHOD FOR AUTOMATED MANAGEMENT SYSTEM DEVELOPMENT

YEFIMOV, VLADIMIR MAKSOVICH, candidate in economic sciences, Moscow State University (Moscow); and KOMAROV, VLADIMIR FEDOROVICH, candidate in economic sciences, NIIsistem [see expansion below] (Novosibirsk)

[Abstract] The paper discusses games simulation of the operation of an automated management system (ASU) before its hardware realization. NIIsistem [Scientific-Research Institute of Automated Systems of Planning and Management] has developed game simulation on a basis of PPP ISUP [application program package, information system for production management]. With the aid of this game it is proposed to achieve the orderly method of approach discussed in the paper, for development and introduction of several concrete ASU. Further growth of the game approach in ASU planning requires that special studies and development be conducted. In particular, it is necessary to create methods for construction and conducting games, methods of evaluating the economic effectiveness of the use of games in the process of planning ASU, to study the possibility of developing special hardware for servicing games, and to study the advisability of creating special software for simulation modeling of management systems. At present these questions are insufficiently investigated. References 5: 3 Russian, 2 Western.

B. Theory of Mathematical Machines

EXPERIMENTAL DIALOGUE SYSTEM BASED ON GRAPHICAL DISPLAY FOR SOLUTION OF
NAVIGATION PROBLEMS

PETRENKO, ANATOLIY IVANOVICH, dr in technical sciences, KPI [Kiev Polytech-
nical Institute] (Kiev); LANIY, VIKTOR YUR'YEVICH, dr in technical sciences
(Kiev); TSURIN, OLEG FILIPPOVICH, candidate in technical sciences, KPI
(Kiev); DROZDENKO, KONSTANTIN VASIL'YEVICH, junior scientific worker (Kiev);
BOBOVSKIY, VALERIY VLADIMIROVICH, candidate in technical science, NPO
"Kristall" [Scientific-Industrial Association "Kristall"] (Kiev); and
SALOVA, YELENA VIKTOROVNA, junior scientific worker, Kiev Polytechnical
Institute (Kiev)

[Abstract] The paper deals with the problem of designing a dialogue system
for solution of navigation problems with the use of a graphic display. The
structure is shown of a system for automatization of navigation based on
such a display, and a number of requirements for the system are formulated.
Information from sensors and radar and navigation information, sensors of
ship's hardware and receivers of the radio navigation system proceeds through
a communication device into an electronic computer EVM with the primary EVM.
The small EVM performs processing of interruptions from the display, regen-
eration of images, and accomplishes a particular series of functional pro-
grams which determine the flexibility and convenience of communication of
the navigator with the EVM. During this, the display is used as a unified
console for solution of all navigational problems. A detailed solution to
several problems of navigation is considered. An experimental dialogue
system for solution of navigational problems has been developed in the De-
partment of Industrial Electronics, Kiev Polytechnical Institute. Figures
2; references 3 (Russian).

VI. GENERAL INFORMATION

A. Conferences

USSR

SEMINAR ON CYLINDRICAL MAGNETIC DOMAINS HELD AT THE INSTITUTE OF ELECTRONIC CONTROL MACHINES

Moscow PRIBORY I SISTEMY UPRAVLENIYA in Russian ["Dedicated To The Memory Of Doctor Of Technical Sciences Professor M. A. Boyarchenkov"] No 4, 78 p 21

[Abstract] The Institute of Electronic Control Machines (INEUM) and the Moscow Power Engineering Institute conducted their second Joint All-Union Seminar "Cylindrical Magnetic Domains" (TsMD) 23-26 May 1978 at the INEUM, 117312 Moscow, GSP-1, ulitsa Vavilova, 24. Experiments in developing materials and equipment were applied to the long-range goal of development of TsMD hardware.

Topics discussed at the seminar were "Materials and Measurements," "Physics of the TsMD and the Elements of Domain-Extending Circuits," "Engineering and Designing of Domain Integrated Microcircuits," "Magnetooptical Materials and Domain Magnetooptical Devices," "Domain Logic and Switching Devices," and "Domain Memories."

Chairman of the seminar was Corresponding Member of the Academy of Sciences USSR B. N. Naumov. A. K. Andreyev acted as Scientific Secretary.

USSR

COMPUTERS IN MANAGEMENT OF SOCIALIST COMPETITION

Moscow EKONOMICHESKIYE NAUKI in Russian No 6, 1978 pp 121-123

AVER'YANOV, V., docent, candidate in economic sciences and GRIGOROVICH, M., docent, candidate of economic sciences, Ternopol'

[Abstract] A report on the Republic Scientific and Technical Conference on Problems and Practice in the Use of Computers in Management of Socialist Competition held at Ternol' in November 1977. The conference was attended by about 250 representatives of Party and Trade-Union organizations, scientific-research institutions, industrial enterprises and a number of VUZ's. Four papers were delivered at the plenary session of the conference: I. G. Korniyenko, Secretary of the Ternopol' Regional Committee of the Ukrainian Communist Party emphasized the importance of generalizing the work conducted by a number of units with respect to introducing computers and mathematical economics methods into the practical organization of the management of

socialist competition; I. I. Gladkiy, secretary of the Ukrainian Republic Council of Trade Unions, Hero of Socialist Labor, discussed the increasing influence of socialist competition on scientific and technical progress and noted that there should be improvements in the system of indices for evaluating the activity of enterprises; Dr in Economic Sciences, P. D. Gumenyuk of the Ternopol' Finance-Economics Institute spoke about general procedural problems in socialist competition; Candidate in Economic Sciences, Ye. V. Savel'yev of the Ternopol' Finance-Economics Institute took up the procedural problems of developing automated systems for management of socialist competition. A number of other reports in the sections of the conference dealt with generalization of experience, and also the results of elaboration of the theoretical and applied aspects of using computers in competition management.

B. Organizations

USSR

A SYSTEMATIC APPROACH TO THE ORGANIZATION OF IDEOLOGICAL EDUCATION AT THE
INSTITUTE OF CYBERNETICS, UKRAINIAN SSR ACADEMY OF SCIENCES

MAR'YANOVYCH, T. P., candidate in physico-mathematical sciences, Secretary
of the Party Committee at the Institute of Cybernetics, Ukrainian SSR
Academy of Sciences

[Abstract] The Institute's Communist Party organization is the center of
the Marxist-Leninist ideology education in which more than 90 percent of
the personnel are involved. About 4000 people attend all kind of political
lectures and seminars. All seminars are organized by Party members, among
whom there are 2 academicians, 5 corresponding members of the Academy of
Sciences of Ukrainian SSR, 23 doctors in sciences and 35 candidates in sci-
ences. The ideological education of the Institute's personnel is conducted
at the seminar, "Philosophical Problems of Cybernetics," under the leader-
ship of Academician V. M. Glushkov and vice-chairman and Corresponding Mem-
ber K. L. Yushchenko, both of the Ukrainian SSR Academy of Sciences. This
seminar promotes not only the ideological education but also presents reports
on progress in cybernetics. It was at this seminar that Academician V. M.
Glushkov interpreted cybernetics on a much broader scale as compared with N.
Wiener interpretation. V. M. Glushkov considers cybernetics as a separate
science and his concepts on this subject were published in the 15th edition
of the Encyclopedia Britannica. Political Information is one of the leading
ideological activities at the Institute which is conducted at 128 sections,
2 or 3 times a week by about 250 political instructors. The quality of
lectures by these instructors and their political erudition is examined on
a regular basis by the Institute's Methodological Council, Ideological Com-
mittee and the Party Bureau. The institute's section of the "Knowledge"
Society organizes lectures on achievements in cybernetics. Council of
Veterans of the Great Patriotic War under the leadership of Hero of Soviet
Union, G. M. Batalov, conducts lectures on international and patriotic edu-
cation. In order to promote the sense of internationalism among youth,
meetings are organized with foreign students who belong to different organi-
zations from the satellite countries of Eastern Europe, as well as from other
countries. Only recently a meeting was organized between an American delega-
tion and the Institute's students in line with the Sputnik program. There
is also a club at the Institute that organizes meetings of students with
famous writers, composers, actors, astronauts, heroes of the Great Patriotic
War, etc. The Institute is well qualified to conduct all kind of education-
al, ideological and recreational activities. Among its personnel, there are
54 doctors of sciences, 383 candidates in sciences, 2 holders of the Lenin
Prize, 22 holders of the State Prize of the Ukrainian SSR, 4 holders of the
Lenin Komsomol Prize and 10 holders of the M. Ostrovskiy Prize of the Ukraini-
an SSR.

C. Personalities

V. S. SEMENIKHIN CELEBRATES 60TH BIRTHDAY

[Abstract] Academician Vladimir Sergeyevich Semenikhin, chief designer of the Soviet Union's first specialized automated management systems, recently celebrated his 60th birthday. V. S. Semenikhin is one of the founders of this new field of science and technology in our country. Thanks to his initiative and energy, scientific-research organizations were established and are successfully carrying out investigations in the field of automated management systems. He also educated a large number of scientists and designers, many of whom have become directors of the most important trends of research on large systems and computer technology.

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